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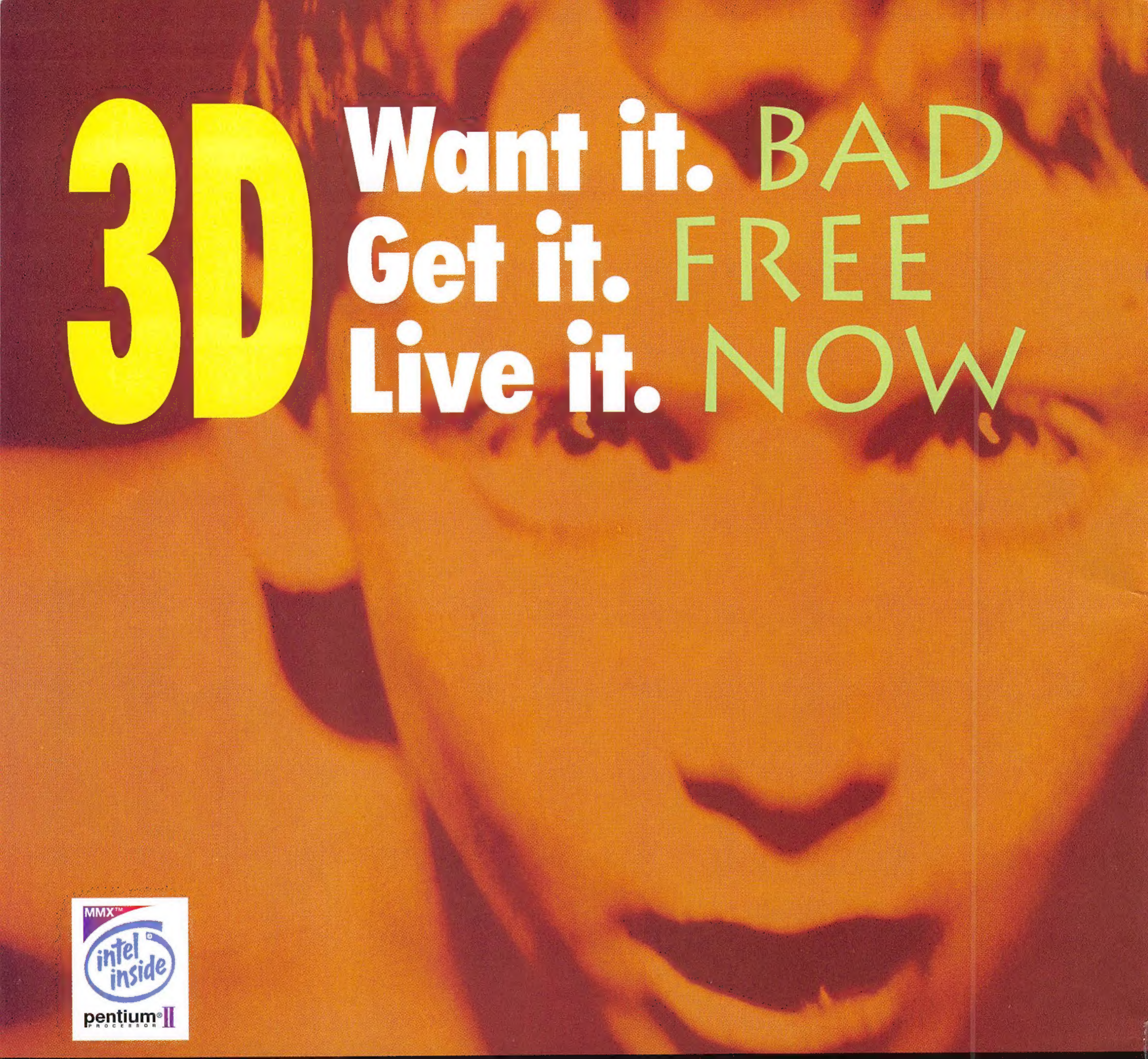

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Product Information Number 182

EDWORD

Get your Motor Running

Following the burn to get last month's jam-packed issue of *boot* out the door to the printer, I just *had* to escape. An old high-school friend who's going on year five of his mid-life crisis was doing the Harley Davidson river run to Laughlin, Nevada and invited me to join him.

An excursion into the desert sounded like just the ticket, so I hopped a wing to LAX and we were off bright and early the next a.m. I was "getting away" from the world of pixels that *is* the bootLab, so I packed pretty Luddite. No notebook PC, no GPS, no manuscripts for next month's issue. Nothing. Except a Pilot PDA. And a digital camera. And a cell phone, which can't *really* be considered technology anymore, can it? Nonetheless, I was alone against the world with the warm wind of the Mojave in my face as we rounded the corner and saw an oasis of garish casinos sprouting out of the desert floor.

The streets of Laughlin rumbled with the blare of tens of thousands of hogs, polished and rolling in full-metal jackets. This seemed to be the farthest point in the world from the Pure PC Power that I live 24/7.

I was wrong.

The more I saw these leather-clad people proudly polishing the chrome on their ride, boasting about the upgrades they'd meticulously researched and installed, and boldly demonstrating what their machine was capable of, the more apparent it became... I was in the same world as before, only spleen-rattling loud pipes had replaced sterility-inducing subwoofers. There is a common thread among people to build the best and take pride in it, whether you're talking Harley Davidsons or Hewlett-Packards. It's what you do with the framework that makes the machine an expression of you and your passion.

All that's missing is the PC-equivalent of biker chicks!

Brad Dosland
Editor in Chief

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60 bootWorthy When the pixels are flying at you hot and heavy, you need the right tools to stay in control. That's when this list of the best game controllers comes in mighty handy.

- ThrustMaster **X-Fighter**
- SpaceTec **SpaceOrb360**
- Extreme Competition Controls **CDS5000**
- CH **Pro Throttle**
- Gravis **GamePad Pro**
- ACT **Power Ramp** and **EagleMax**

PLUS a preview of the next wave of killer controllers, including:

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- Fujitsu's **innovative split-design** notebook
- LucasArts' long-awaited **X-Wing vs. TIE Fighter**

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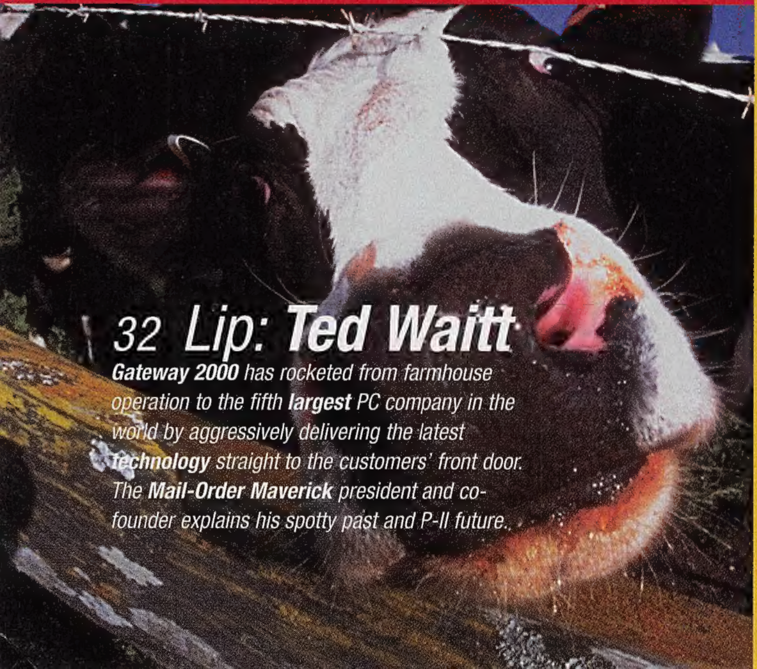
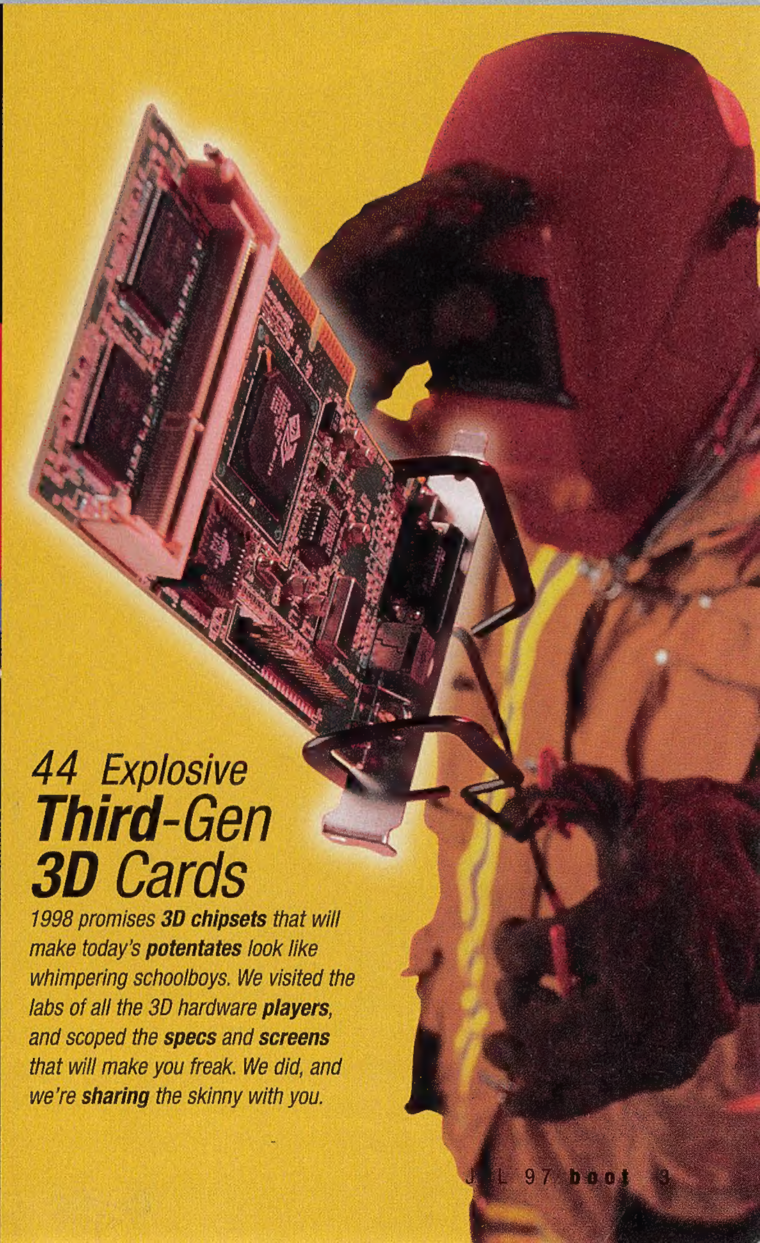
How-to Create Your Own Digital Video Epic.
Today's desktop **digital video** is cheap, powerful, and easy-to-use—so why are you letting your **capture board** atrophy into nothingness? Grab your **Hi-8 camcorder** and follow along with our step-by-step for an **attack** through hyperspace.



32 Lip: **Ted Waitt**

Gateway 2000 has rocketed from farmhouse operation to the fifth **largest** PC company in the world by aggressively delivering the latest **technology** straight to the customers' front door. The **Mail-Order Maverick** president and co-founder explains his spotty past and P-II future.



44 Explosive **Third**-Gen **3D** Cards

1998 promises **3D chipsets** that will make today's **potentates** look like whimpering schoolboys. We visited the labs of all the 3D hardware **players**, and scoped the **specs** and **screens** that will make you freak. We did, and we're **sharing** the skinny with you.

"When I created Doom I never imagined there'd be such a killer way to play it. WingMan Warrior is it."
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WARRIOR

John Romero
Id Software Stud and co-creator of Doom, Doom II, Heretic, Hexen and Quake.

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COMM PORT

Love/Hate Relationship

I hate your magazine. It provides no information I can't get in a $4 magazine and the demos aren't even that great. Also, it contains profanity and images that I had no idea were in there because of the plastic wrapper.

P.S. How about lowering the newsstand price just a little?

James Beyer

Seeking Overclocking

I recently discovered your mag when the local bookstore suggested it as "the best info with no crap." In the issue I bought, a Comm Port letter thanked you for the overclocking tip. I'd appreciate it if you could direct me to a source for this info. (I imagine re-publishing it would anger regular readers.) Please forgive my tardiness in discovering you.

Chris Rawluck

WEB EDITOR DAEVID VINCENT REPLIES: *You aren't the only one in search of this controversial article. As part of the new* bootNet, *we've added a section called: You Asked For It. These pages recreate our most frequently requested magazine articles. The wildly popular overclocking can be found at:* **www.bootnet.com/youaskedforit/12step_overclockingcpu.html**

Whither M2?

I'm getting ready to buy the fastest PC this side of the Mississippi. One problem: an Intel MMX processor. I'd really like to have the Cyrix M2 instead because it looks like it will outperform the Intel chip. Do you know the release date?

Matt Chabot

HARDWARE EDITOR ANDREW SANCHEZ REPLIES: *The processor is ready to rock, but Cyrix is having a helluva time convincing the world their latest is ready for prime time. While AMD is enjoying support from every major motherboard maker, as of this writing, none have M2 compatibility. Designers are hesitant to create MMX systems based on M2 due to the incompatibility issues they encountered the last time around with Cyrix.*

> *"If I read **one more letter** from 'power users' complaining that Win95 is 'complicated, slow, buggy, and resource hungry' **I'm going to vomit.**"*

F-22 Panic

Yesterday I read that NovaLogic is trying to get exclusive rights to the name and look of the F-22. I've been waiting for *iF-22* and *TFX3* for six months, and the thought that I may never play these games is freaking me out. I almost got fired today because of my impatient mood. Please tell me this issue can be worked out, what have you heard?

Alexy Yessayan

EDITOR IN CHIEF BRAD DOSLAND REPLIES: *Interactive Magic has sent me all their claims and I've spoken to the president of NovaLogic. He assures me that he has no problem with Interactive Magic, or anyone else, doing an F-22 sim. All he's asking is that they use a shelf name significantly different from the name his company has registered, F-22 Raptor. If everyone behaves like an adult, this fracas shouldn't hold up the releases significantly.*

Sounds Clear

The PC has always been an inferior platform for sound. Will the new SEC motherboard standard (isolating the power supply and drives from the motherboard), combined with PCI sound cards, finally overcome the problems mentioned by Tac Sugiyama in the *boot* 07 preview of the Sony PCV-120 and deliver the S/N needed for high-end audio?

Zevvetzer NoiseHead

HARDWARE EDITOR ANDREW SANCHEZ REPLIES: *You don't need a PCI-based card to enjoy hiss-free digital performance. In theory, you should get awesome digital sound with the right digital processor if you engineer the hell out of it.*

Look at this month's Turtle Beach Pinnacle review on page 89 for an example of excellent digital sound... over an ISA bus! The PCI bus' ultra-low CPU utilization allows more channels of digital audio without bogging down the CPU.

Until DirectSound becomes the standard and PCI sound card manufacturers have the infrastructure to handled OEM orders, you won't see them on motherboards any time soon. High-end audio simply isn't a top priority for manufacturers, as opposed to Sound Blaster compatibility, which is still very important in today's computing landscape.

Sinner or Saint?

I couldn't believe all the Alex St. John bashing in *boot* 09's Comm Port. I love the interview with St. John and I think he said what we all know is true but were afraid to believe. Just think back: How long ago did most of us upgrade from DOS 5.0 to DOS 6.0 for fear of bugs? Now we're clinging to DOS 6.22. We all know St. John is right, he just has the balls to say it. So if you want to avoid Win95 games and apps, go ahead. I guess some people still like to play *Pong*.

David Haynes

Some co-workers and I were discussing Microsoft's "Buy Now and Upgrade Forever" system. Just like the tobacco industry, they have us hooked on their drug. You're either designing hardware to support their products, writing software to run their products, or paying money to buy their products.

The problems is: Their products are only designed to last a year or two, forcing you to

THE POWERVR REVOLUTIONARIES
INTERVIEW

DIVA LA REVOLUCIÓN

Tomb Raider's fiery Lara Croft is one of the most recognized figures of the PowerVR™ Revolution. A confrontationalist, she has grown tired of the old 3D Order. With passion and anger, Lara has been relentlessly fanning the flames of revolutionary justice for gamers around the world.

WELCOME TO THE MOVEMENT. APPARENTLY, DISCOVERING ANCIENT TOMBS HAS FAILED TO SATISFY THE RADICAL HUNGERS THAT GNAW AT YOUR SOUL?

Lara Croft: My first passion will always be exploring ancient civilizations. But when I realized gamers were being kept down by inferior 3D technology, I went balistic. I'm busting my arse to get gamers the 3D experience they deserve.

SO THE BLAND 3D EXPERIENCE WAS BOUND TO PRODUCE A REVOLT?

L: Absolutely. But this is an armed struggle, love. And the weapon is not the Colt .45 in my hand. It's the PowerVR 3D technology that will topple the bloody awful 3D experience.

ARE YOU SAYING EVERYTHING ABOUT CONVENTIONAL 3D TECHNOLOGIES DESERVES TO PERISH—SHOVED OFF TO THE ASH HEAP OF OBSOLESCENCE?

L: Bloody right, mate. Gamers want 3D technology that liberates their experience. Like higher resolution. Higher frame rates. Effects that take them as close to reality as you can get.

LIBERATION SEEMS TO BE A CENTRAL THEME DRIVING THE MOVEMENT.

L: Look, if I could escape the suffocating arrogance of snooty British society, gamers could overthrow the forces trying to smash the PowerVR resistance. That's what pumps adrenaline through my body.

UM, DON'T TAKE THIS THE WRONG WAY LARA, BUT THAT'S SOME BODY.

L: Actually, you should see it at 800x600 resolution. I think you'd dig my aerial flips with realistic shadows.

WHEW, WELL, UH...SO LARA, THESE ARE EXCITING, TURBULENT TIMES. GAMERS AND GAME DEVELOPERS SEEM TO BE GETTING SWEPT UP IN THE PROMISE OF POWERVR.

L: That's right. Our freedom fighters are developing games right now that are PowerVR Ready. Eidos, Kalisto, Shiny, Sega Entertainment, FASA, Activision, Core Design, Gremlin. All feverishly churning out PowerVR Ready titles, including my next adventure, Tomb Raider 2.

WOULD YOU SAY THE MOVEMENT IS OBSESSED WITH POWER?

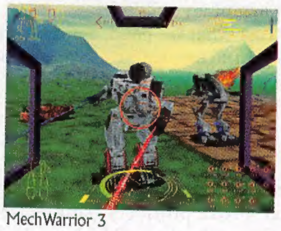
L: Of course, you twit. Frankly, we're not stopping until we have profoundly altered 3D reality for all gamers. And we will! Because we have finally seized the ultimate apparatus of real 3D power.

THE POWERVR TECHNOLOGY?

L: Yes. And with it, there will be no obstacles that can stand in the way of the mission of the PowerVR revolution: to produce the most realistic game experience imaginable. Now bugger off, I've got a battle to fight.

Tomb Raider

MDK


MechWarrior 3

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beg for the latest "upgrade." If they're so hot, why do their products require so much "upgrading"?

Gil Laroya

If I read one more letter from "power users" complaining that Win95 is "complicated, slow, buggy, and resource hungry" I'm going to vomit. "DOS is faster" they cry. "DirectX screwed something up" they whine. I've never seen so many wussies in my life! These morons don't deserve to read a quality magazine like *boot*. Learn to control Win95, don't let it control you. Master the Registry. Keep your drivers up to date (and close by).

Tom Riegsecker

Popping a Bonner

I had to laugh when reading the Gillian Bonner interview (*boot* 09). What a bloody hypocrite! This woman sold out to *Playboy* to draw attention to herself and her company, but complains fervently that *Duke Nukem 3D* exploits women to sell games. She rants how uninteresting and non-innovative games are, but admits she hasn't played enough of them to warrant an opinion.

Just what we need, a bimbo with a briefcase. Someone save this woman before she hurts herself!

Tim

A Tax Upon Your House

A recent bootWire online news story said local service providers claim an Internet traffic surcharge could adversely affect their business, since end users will ultimately be saddled with a monthly rate hike of more than $5.

Only $5? I wish. My figures are different. If my provider is charged 1 cent a minute for every minute I am on, I'm sure they'll pass me the entire bill. Now, I currently get 100 hours for $25. If you take that 60 cents extra an hour and multiply it by the 100 hours, that's $60. And that's just the phone company's take, not to mention my usual bill of $25. So, basically, it comes out to be $85 for 100 hours of use. Looks like the ISP will fall and phone giants such as AT&T will step in and rule the Internet market. AT&T owns most of the lines, do you think they'll charge themselves? Ma Bell has found a way to squeeze out the little guy.

Bradford Youngkin

EXECUTIVE EDITOR JON PHILLIPS REPLIES: *When the telcos built their infrastructures, they assumed that the average consumer would make just a few five-minute phone calls a day. They had no idea all their lines would be tied up by continuous Internet sessions.*

Now the telcos want to charge someone–anyone–for all the extra traffic. The proposed per-minute fees were rejected by the FCC, which will allow telcos to up monthly line charges to homes and business that use more than one phone line. In January '98, maximum per-line rates will rise from $6 to $7.50. This means an ISP that uses 30,000 lines will pay its telco an additional $45,000 each month for the $1.50 per-line increase. Will consumers bear the brunt? Most likely. But we're talking a matter of pennies each month, not the $85 you're worried about.

Backdoor Man

I just read the article about government legislation of data encryption (bootWire, *boot* 09), and I find the concept revolting. Once again, the government, in their vain paranoia, is attempting to regulate something which is none of their concern.

Data encryption exists to protect business and personal data from prying eyes. These prying eyes–of which hackers are the least of our worries–need backdoors. Encrypted data, with a backdoor key for the so-called "authorities," is a farce. I foresee a time when money is not the only thing kept overseas. We are already seeing a rise in companies specializing in data storage for a fee. What's next... Swiss Hard Drive Accounts?

Chris Louviere

Velo Not on Shelves

You gave Philips' Velo HPC the highest Windows CE-based rating, yet it had not hit the market. Philips says the Velo is in distribution channels and we should see it at CompuUSA soon. It's great to give us previews, but recommending the Velo before we can even buy production models is not right. I'd like to buy a Velo but I need something now. For all I know, the product could still be vaporware and I'll end up waiting for something that never appears. In the future, let us know if you're reviewing pre-release models or if the item is actually available.

Dwayne Tucker

EDITOR IN CHIEF BRAD DOSLAND REPLIES: *We take pains to time our reviews so they coincide with the product hitting store shelves (as opposed to magazines that review a buggy beta a year before it's released just to be first on the block), but unfortunately, ship dates often slip in this industry.*

Trust us, we only review certifiable final products and we try to time the review to help your buying decision, not show off for our cronies. BTW: The Velo should be on store shelves as you read this.

Don't Believe the x2 Hype

I recently fell prey to the x2 hype and purchased a U.S. Robotics 56Kbps modem. Now I'm paying for it. My ISP supports the x2 protocol, but I can only connect at 28.8.

The problem is that my phone line is too old. I ran the line-test program included on x2's CD-ROM and it said my line was not x2-compatible, but didn't tell me how to make it compatible. The line is as old as my house (about 30 years). I asked the phone company about this and they acted as if I was speaking in tongues. Trying to get hold of USR's tech support was equally entertaining. If I were to have the line replaced, would that help my connection speed, or am I the proud owner of an expensive 28.8 modem?

Xeno

EXECUTIVE EDITOR JON PHILLIPS REPLIES: *Sorry, but you've encountered one of the many hurdles that prohibit x2 from achieving, or even approaching, 56Kbps throughput (most users are lucky to get 46Kbps).*

Unfortunately, line replacement isn't a typical customer request. It means ripping into an infrastructure that's been working fine and dandy for POTS for years. Before you go back to your telco and request to speak to someone with half a brain, make sure that your line problems aren't in your house: Hook your modem directly to your phone box and see if your throughput improves. If it does, you need better local wiring. If it doesn't, tell your phone company that its lines are woefully inadequate, and demand replacement.

More PDA Coverage!

I stumbled across *boot* 08 and the *bootDisc* of PDA shareware was the best! I'm a dedicated Psion user and your rating is right on the mark. Nothing comes close to the Psion for elegance alone. Psion thought through every detail in the GUI and every feature a person could think of is implemented. Why not have a PDA section in your mag?

Dion Sorrell

EDITOR IN CHIEF BRAD DOSLAND REPLIES: *Some readers think PDAs and HPCs are off-topic, but we love 'em. Their pocket power is functional and oh-so-sexy. We'll continue to cover them, and starting next month we're adding a "Spotlight On:" section to the reviews section that will occasionally focus on PDA software (in addition to various plug-ins, utilities, shareware, etc.) and give us an excuse to pack more PDA software on the* bootDisc.

Cut, Copy, Paste

The lawyers at IDG (publishers of *PC World* and the *...For Dummies* series of books) asked us to apologize for using their trademark in our "boot For Dummies" parody (Glitch, *boot* 07)—which is protected speech under Fair Use laws—and promise that we won't boost their "intellectual" property in the future. (As in a parody called "Lawsuits For Dummies.")

The PIO Mode Transfer Rates table (White Paper, *boot* 10, page 53) should read PIO Mode 4 Transfer Rate of 16.6MB/sec not 6.6MB/sec.

In bootRadar (*boot* 10) Ulead Systems' *MediaStation Pro 5.0* should read *MediaStudio Pro 5.0*

On the Line Uproar

Columnist Shel Kimen's installment of On the Line, titled "Don't Hate/Love Me Because I'm Beautiful" in boot *09 drew a record amount of response. Many agreed with her, many disagreed, many felt* boot *was an inappropriate venue for the message.*

I appreciate the passion of this mail. That sort of caring is what differentiates boot readers from the flock. Our decision to publish the volatile column was based on respect for Kimen's voice and recognition that the issue is prevalent in the online community her column covers. We believe it is not off the subject.

If you read boot *just for the silicon and solder that make up a PC, ignorant of the human component, I am sorry this column offended you. We will continue to deliver the most honest and aggressive tech journalism published today, but we will not back off sensitive issues that warrant attention.*

Brad Dosland, Editor in chief

I completely agree with all Shel Kimen has to say. I regard her works as informative essays coming from one of the best cutting-edge minds in the industry. That anyone should rate such talent based on gender is an atrocity. As a member of that group, please let me beg your pardon for the impropriety of these lower elements who continue to think with such a regressive mentality.

Unfortunately, a couple of pages after your article is an interview with Gillian Bonner. She claims that she didn't sell out women, but empowered them. However, I can't imagine too many people (read "guys") were looking at her layout in *Playboy* and thinking, "Wow, what a programmer she must be."

boot is an awesome periodical and I would hope that its audience can understand and respect what you're saying. As for your picture, please leave it with your articles so we know from whom such objective journalism comes. However, I'd recommend removing the black bar from across your eyes, for they are indeed mesmerizing.

Jeff Roberts

If Shel has a problem with the way people look at her, I'd suggest a burlap bag over her head. Since when is a compliment an overt act of hostility?

I've been reading *boot* since the first issue and truthfully I've never seen Shel's picture until today. The tape across her eyes was misplaced, it should have been across her mouth. In the future, Shel, keep your face, your attitude, and your sexism to yourself.

Guy Natale

I totally agree with your column. I am a reasonably attractive female, and a computer geek for the past 17 years... and I have been dealing with the same shit you described. It's funny... male geeks think I'm cute cause I know so much, but they still like to think that they know more then me. The non-geeks worship my knowledge, yet feel the need to put me down for being such a geek. They feel threatened by my being "smarter" then them, and I have been told that I "spend too much time with my computer". Well how else would I get so smart?

I wish I had a friend like you. All of the women I know seem to be interested in only one thing... MEN. I like to see girls doing things with their lives... and fighting for respect and equality!

Rebecca

I apologize for all the "degrading" e-mail you've received from us Neanderthals, but a huge chasm exists between the male and female gender's approaches to visual stimulation. Gloria Steinem says that the most important and sensitive sexual organ of men of Western European culture is their eyes.

So why are you so upset? You seem to want all men to "move to the higher level" (a la Heaven's Gate, maybe?) when you must know by now–since you're still calling us Neanderthals–that it isn't going to happen. Evolution works pretty slowly.

boot has a primarily male, primarily geeky, audience, and you enjoy what can only be described as an extremely privileged position to even have a monthly column in it, plus I suspect you get paid better than 85% of your readership.

The bottom line is that you're giving yourself the higher moral ground, when all you're really doing is putting down males responding to a cultural defect that makes them respond to visual images differently than you. I think you are the sexist!

Gerry Kaufhold

Why even go there girl?

Take it from an old geezer... you are either cute or very photogenic. Oh yeah, when a father figure says "You look very pretty" it ain't sexual or sexist and it's insane to be hurt by these types of comments.

I think it is wonderful that you work for a magazine that still tries to personify a writers work by including their picture and a brief description of the person. This is old school journalism and I like it.

I was raised in a different era and still believe that a compliment is a compliment. Take them as they are meant and don't read a lot into them. Maybe some therapy would get Shel past this problem. She should try getting in touch with a good therapist or maybe even give Gillian Bonner a call. She seems to have it all together and in perspective.

I'm sorry if I hurt your feelings. Please forgive me. And try to find it in your heart to forgive all the other Neanderthals that buy your magazine and pay your salary so you can insult us.

Russ Mattox

Advice to Shel Kimen: read **news.announce.newusers**, and drop the rationalization. No noble cause justifies off-topic posts; once you open those floodgates, the S/N ratio drops to epsilon, as if it hadn't already.

James Jones

I was startled, pleased, and appalled by *boot* 09's column. Congratulations for putting such a worthwhile statement into a column. I know it's hard to do "off-topic" columns, especially personal ones, but *boot*'s focus on computer "culture" makes it relevant. In fact, given the misogynist nature of many of the games *boot* reviews, I'd love to see more of this.

Mark L. Crosley

How inappropriate to reduce your magazine to another political stage on the state of relations between men and women. I, for one, don't send my $35 to *boot* to hear some woman whine about insensitive males. I buy *boot* for only one reason, the inside information about computers and how they perform. The technical information is top notch. *boot* stands apart, with cutting-edge reports and sharp insights into the nuts and bolts of the computer industry. The last time I checked, that didn't include the starving children in North Korea, the trouble in the Middle East, or Shel Kimen's feelings. She has ruined the last remaining authoritative computer magazine.

Donnie Smith Sr.

Shel managed to convey so much in such a small space that I had to read the column several times to sort everything out.

Thank you, Shel, for letting me see the world through your mind's eye. I'd much like to return the gift. A picture is like the cover of a book. Good enough to entice one to pick it up, but it's the writer's skill that determines if the book is read cover to cover.

Well, Shel, I am not one who does the things you dislike. Just someone who liked what he saw of what little you cared to show. I like your style, lass. Don't know about the others, am impressed by the skill in which you handled a touchy situation. Personally, I saw things in a different light. Some things I am still puzzled by. Would like to check things out with Shel, if she is willing.

When I got to the "dog thing," I did become upset, and I did think of Shel as a "femi-Nazi" until "yadda yadda yawn." That calmed me down.

David Knight

The last time I read Kimen's column on Macromedia, I thought, "This guy is right on." I guess it's because I'm not influenced by male hormones, but I honestly thought she was a guy in the quick glance I gave at the picture. Then again, I read computer magazines for the information, not the pictures.

Jennifer Zapp

WHEN IT COMES TO AWARDS, THERE

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PC COMPUTING 3-time A-LIST - XPS M200s
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PC COMPUTING MVP WORKHORSE DESKTOP - XPS P200s
PC MAGAZINE EDITORS' CHOICE AWARD - XPS Pro200n
AGAZINE EDITORS' CHOICE AWARD - XPS P200s
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141 AWARDS ACROSS THE ENTIRE DIMENSION LINE

What do the awards given by *PC Magazine, PC Computing, PC World, Windows Magazine,* and *Computer Shopper* (over 140 honors since 1/96!) have to do with you? It means you'll now be running dramatic multimedia presentations on the high-end systems that have earned designations like *PC Magazine* Editors' Choice for Best Business PC. It means you'll be cruising the Internet on systems designated MVP and 5-Star Award winners by *PC Computing.* And it means a whole lot more since they're also awarding our great reliability and price. Which is what a firm commitment to cutting edge engineering will get you.

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bootDISC

EVERY MONTH, **BOOT** DELIVERS **OVER 600MB** OF THE **HOTTEST** DEMOS AND **COOLEST** APPS

TRY IT ON THE DISC

The City of Lost Children

DOS and Win95 Demo is fully interactive giving you a taste of what the full release is like. **See the review on page 104.**

darklight
CONFLICT

DOS and Win95 Demo offers Arcade play limited to 4 mins, Adventure limited to 2 missions, and a multiplayer game limited to 3 players and 10 mins. **See the review on page 110.**

Shoot to Thrill
Select a clip to view
back
Install PhotoShop
Install Premiere

This month's feature shows you how to produce your very own Star Wars *clone. All the software you need is on the* bootDisc. *We've included* Adobe Photoshop *and* Premiere, *all the film clips, sound files, and animation frames we used to make our video, as well as practical tips and techniques in the* bootDisc*'s Feature section.*

So turn to page 38, become one with the force, and meet your destiny.

The bootDisc *features some of the benchmarking apps we use in the* bootLab *including: the* bootMark, *Adaptec Threadmark, CDTach Pro,* MDK PerfTest, DeBabelizer Pro *(real-world MMX benchmark—yes, this month's* bootDisc *includes the fully compliant MMX version!), and our grueling* Quake *benchmark (*Quake *application not included).*

VIRTUS
DEATHMATCH MAKER

Win95 Demo doesn't let you save your levels or compile the visibility for your level. **See the review on page 57.**

MEAT PUPPET

Win95 Demo is a micro-mission in which you must complete a mission that takes place in the sewers. **See the review on page 104.**

George Clinton
P-Funk Remix
mixman

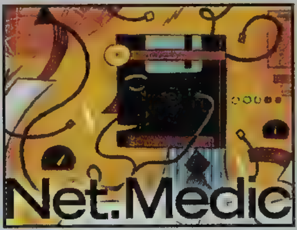
Win95 Demo contains the full version of the song "Booty Body Ready for the Plush Funk" for you to remix. **See the review on page 108.**

MOTO RACER GP

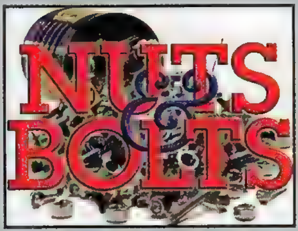
Win95 Demo offers one Grand Prix course and one motocross course, each with a bike. **See the review on page 83.**

NEED FOR SPEED II

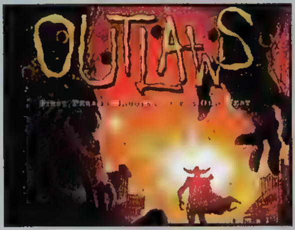
DOS and Win95 Interactive demo lets you race the Pacific Spirit course driving a GT90 automobile. **See the review on page 106.**



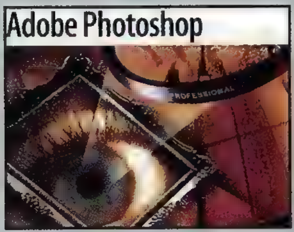
Win95 The basic features are free to use; the advanced features are good for 30 days. **See the review on page 109.**



Win95 Fully functional demo of Bomb Shelter, one of the 17 apps that make up *Nuts & Bolts*. **See the review on page 94.**



Win95 The multiplayer update is included with this one-level demo so you can shoot-up your best friends. **See the review on page 98.**


Adobe Photoshop
PROFESSIONAL

Win95 This is a fully functional evaluation demo with a 30-day time limit. **See the Digital Video feature on page 38.**

Adobe Premiere 4.2

Win95 This is a fully functional evaluation demo with a 30-day time limit. **See the Digital Video feature on page 38.**

RALLY
CHAMPIONSHIP

DOS Demo lets you race a single track in a Subaru Impreza with all of the car options turned on. **See the review on page 106.**

Smart Bookmarks
1

Win95 This is a 30-day evaluation version. **See the review on page 109.**

internet3D
Space Builder
2.1

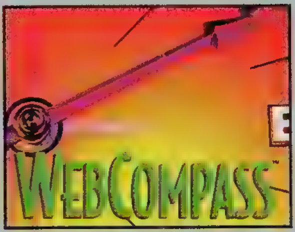
Win95 Evaluation version is fully functional for 30 days. **See the review on page 83.**

HUMMER
TEST DRIVE
OFF-ROAD

DOS and Win95 Demo contains two tracks featuring two environments. **See the review on page 106.**

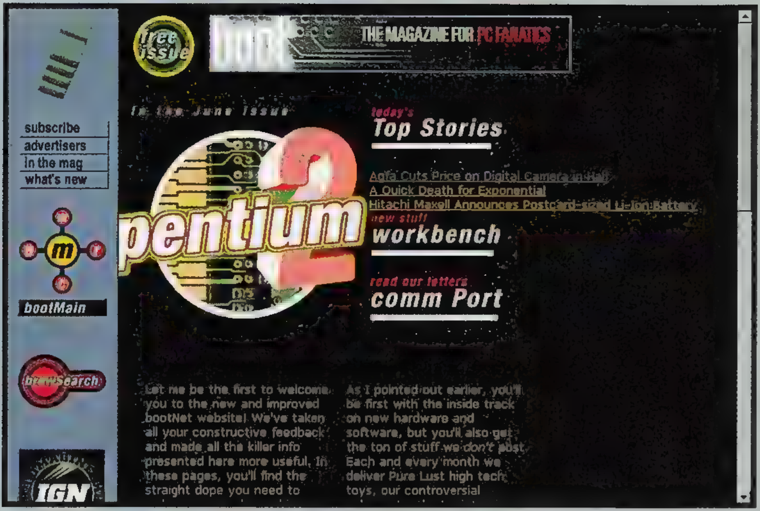
theme HOSPITAL

DOS and Win95 Cure 20 patients in a year in this demo trialware version. **See the review on page 96.**


WEBCOMPASS

Win95 This is a fully functional trialware version. **See the review on page 109.**

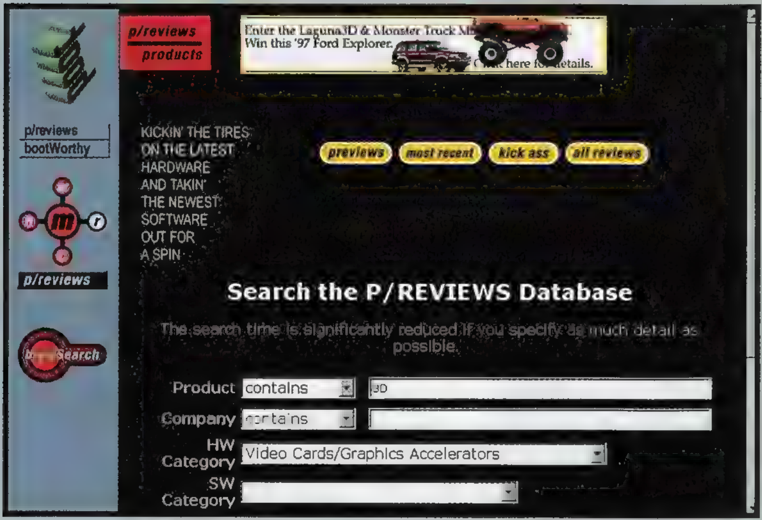
bootNET



Agfa Cuts Price on Digital Camera in Half
A Quick Death for Exponential
Hitachi Maxell Announces Postcard-sized Li-Ion Battery

Let me be the first to welcome you to the new and improved bootNet website! We've taken all your constructive feedback and made all the killer info presented here more useful. In these pages, you'll find the straight dope you need to

As I pointed out earlier, you'll be first with the inside track on new hardware and software, but you'll also get the ton of stuff we don't post. Each and every month we deliver Pure Lust high tech toys, our controversial



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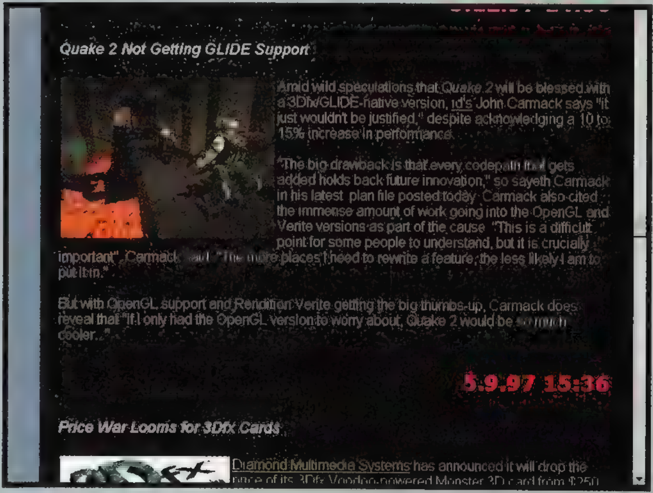
Tireless Reporting

bootNet's **bootWire** is fast becoming *the* source for PC-centric news. We post breaking news flashes throughout the day, including exclusive scoops, reports from trade shows, and previews of upcoming *boot* magazine stories. If you subscribe to our e-mail push service, you can even get instant notice of bootWire updates as they happen.



Quake 2 Not Getting GLIDE Support

Amid wild speculations that *Quake 2* will be blessed with a 3Dfx/GLIDE-native version, id's John Carmack says "it just wouldn't be justified," despite acknowledging a 10 to 15% increase in performance.

"The big drawback is that every codepath that gets added holds back future innovation," so sayeth Carmack in his latest plan file posted today. Carmack also cited the immense amount of work going into the OpenGL and Verite versions as part of the cause. "This is a difficult point for some people to understand, but it is crucially important", Carmack said. "The more places I need to rewrite a feature, the less likely I am to put it in."

But with OpenGL support and Rendition Verite getting the big thumbs-up, Carmack does reveal that "if I only had the OpenGL version to worry about, Quake 2 would be so much cooler..."

5.9.97 15:36

Price War Looms for 3Dfx Cards

Diamond Multimedia Systems has announced it will drop the price of its 3Dfx Voodoo-powered Monster 3D card from $250

- 5.2.97 - Virtual I-O Shuts Down Permanently
- 5.2.97 - Computer Game Developer's Conference boot Update
- 5.2.97 - Creative Sound Theory
- 5.2.97 - Pleasures In Duke Paradise

*Have You Taken Your Dose of **boot** Today?*

Spam Haters Unite

TRY IT ON THE DISC

Tired of those hare-brained get-rich-quick e-mail schemes? Want to hit back? If so, check out *Spam Hater*, a free Win95 application that helps you respond effectively to the idiot mail flooding your mailbox.

Spam Hater analyzes the source of the spam message and extracts a list of addresses of relevant postmasters. A reply is automatically prepared from a predetermined list of legal threats, insults, and polite flames, or you can customize your own message. *Spam Hater* works with a multitude of e-mail programs, including those from AOL, Netscape, and Eudora. *Spam Hater* can also generate a WHOIS query to track down the perpetrator, and a TRACEROUTE query to track down the perp's upstream provider.

Spam Hater can be downloaded from **www.compulink.co.uk/~net-services/spam/**

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Duke and Quake: Together at Last

The next installment of the *Duke Nukem* series, titled *Duke Nukem Forever*, will abandon 3D Realms' 2½D ray-cast engine (which powered *Duke Nukem 3D* to the top of the sales charts) and will employ id Software's *Quake II* engine.

GT Interactive, the publisher of both *Quake* and *Duke Nukem 3D*, will hold all interactive publishing rights for PCs and console systems, as well as rights to the next sequel. Apogee's 3D Realms division will continue doing development for the project.

George Broussard, president of 3D Realms, asked in a release announcing the decision, "What more can players ask for than the combination of *Quake*'s technology with *Duke Nukem*'s attitude and interactive gameplay?"

Duke Nukem Forever's release date has yet to be announced.

Ticketmaster Sues **Microsoft**

Ticketmaster has filed a lawsuit against Microsoft claiming "electronic piracy" after Microsoft included a link to Ticketmaster's web site on Microsoft's Seattle Sidewalk site.

The lawsuit, filed in U.S. District Court in Los Angeles, contends that Microsoft is illegally using the Ticketmaster name and trademark, and is diluting the commercial value of Ticketmaster's site and marketing relationships. The company is seeking a court order barring use or reference to it on the Seattle Sidewalk site, and financial compensation for damages and fees associated with the "illegal link."

"We have more than 5,000 sites already linked to the main Ticketmaster site," says Ticketmaster's vice president of multimedia Alan Citron, "and this isn't about maliciously hunting down other web sites with a Ticketmaster link." According to Citron, Ticketmaster was in negotiation with Microsoft to provide specific content, but when the deal fell through, Microsoft refused Ticketmaster's request to remove relevant material from the Seattle Sidewalk site.

Although he wouldn't comment on the lawsuit particulars, a Microsoft spokesman did admit that they find the lawsuit puzzling, "especially since a link would send more customers directly to the Ticketmaster site, ultimately boosting their sales."

Ironically, Ticketmaster is owned by Paul Allen—a Microsoft co-founder.

Intel vs. Virtua Fighter. *Fight!*

Intel, Sony, and Microsoft have announced a new hardware spec that will turn a Pentium-II PC into an arcade-game development platform able to compete with the RISC-powered machines by Namco and Sega.

The minimum hardware specs of the new system will include a Pentium II (running at either 233MHz or 266MHz with 512K of L2 cache), 32MB of RAM, and 3D-accelerated graphics based on Quantum3D's 3Dfx Obsidian chipset. The machine will utilize off-the-shelf components including Intel's 440FX PCIset, Win95 or NT 4.0, and a shock-resistant 3GB hard drive. The beauty of the system is that an arcade owner need only make the initial investment in the arcade machine—they can upgrade the CPU whenever they feel the need. The system will also incorporate the 440LX PCIset and AGP once they're available.

Intel claims the new system will meet or exceed the visual excellence of Sega's *Virtua Fighter 3*, but whether developers will be able to create a *VF3* killer based on the lowly CISC processor remains to be seen.

Getting Under Your *Skin*

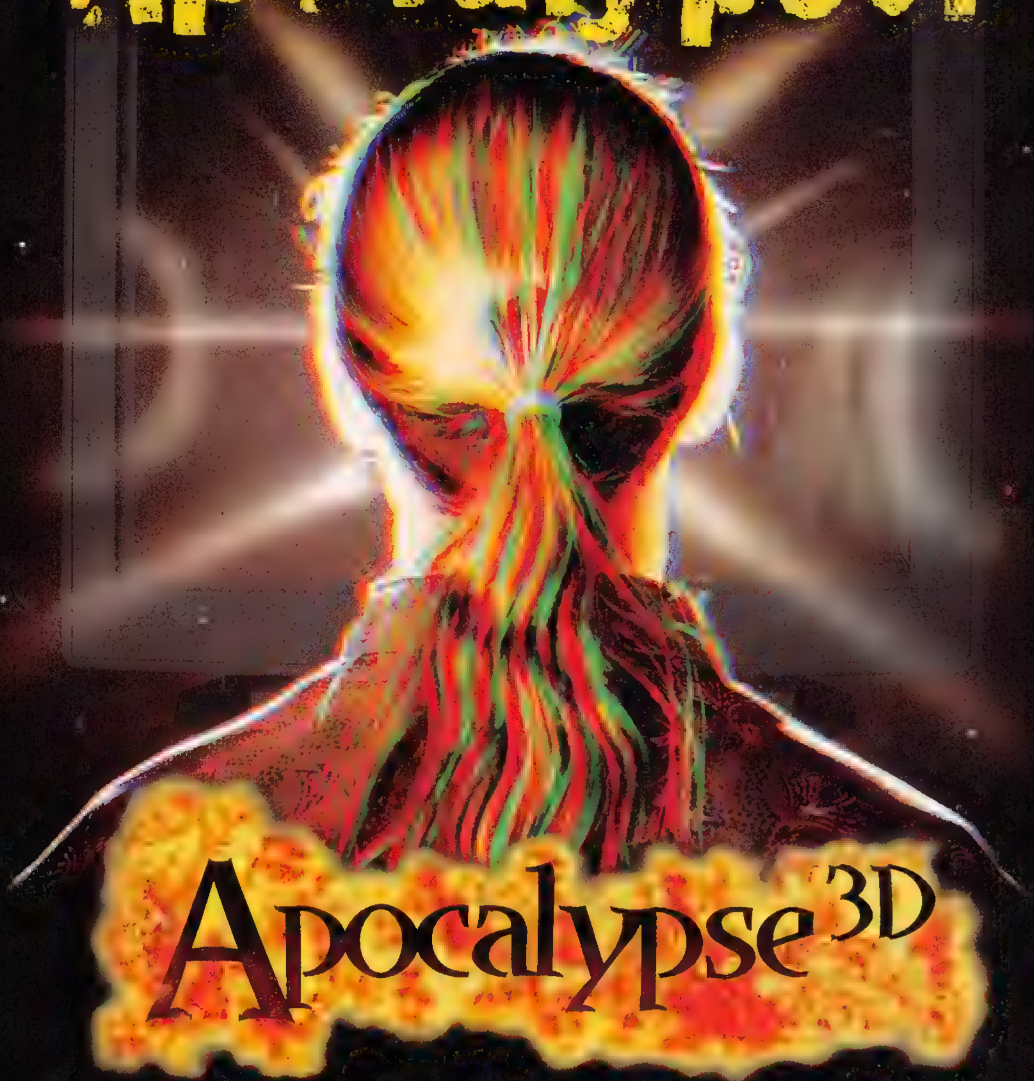
According to *New Scientist* magazine, a small California research company is patenting a programmable tattoo consisting of a small liquid-crystal display that's inserted just beneath the skin on your wrist.

The display is connected to a control chip and powered by a small battery, both of which are implanted during an outpatient appointment. Because human skin is partially transparent, the display is clearly visible. The battery can be recharged by holding your wrist with the implant near a charger.

In addition to being a hip fashion accessory, the tattoo could also contain biosensors monitoring body temperature and blood pressure, or the tattoo could, theoretically, be used for human tagging.

Are you ready for the

Apocalypse?



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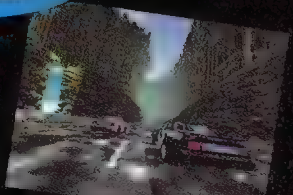

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Product Information Number 85

The 1997 Computer Game Developers Conference in 3D

A special boot report from the show floor

The Computer Game Developers Conference is the premiere event for developers and PR folks to show off their wares, talk about technologies, and quaff a few. But, unlike previous shows, this year's event was huge—especially the trade-show floor; the perfect place for the boot team to scope out the latest creations.

One thing dominated this year's event: 3D. And not just the texture-mapped polygon kind either. Since the next *Quake*-killer can't be made without the proper software development tools, there were tons of 3D tools on display.

Preaching DirectX 5.0, Microsoft showcased its newest API alongside pre-release betas of the much-vaunted Windows 98 (Memphis). Although the *Internet Explorer 4.0* integrated shell wasn't ready for prime time, Memphis' dual-monitor support was getting the crowd ready for its eventual release.

Softimage presented revision 3.7 of its self-titled 3D-modeler and animation software package. With additional hardware, exporting *Softimage*-designed models into PlayStation, Nintendo 64, and Direct3D environments has never been easier. New to version 3.7 is a fully integrated 3D-painting program with real-time lighting and gestural mouse input for easier animation.

Rendition's **stereoscopic** version of *Quake* looks **amazing**. Using wireless **LCD glasses** from H3D, stereo VQuake reclaims the crown from GLQuake as the **most impressive** version of the game.

Even more exciting is the release of *Softimage 3D 4.0* (code named Sumatra) later this year, which will incorporate a nonlinear animation system that allows an animated object or sub-object to be broken down as a separate channel.

While word on *3D Studio Max 2.0* was hard to come by (aside from news that Q3/Q4 is the target ship date), Kinetix had incredible new plug-ins up and running. *HyperMatter* applies reactions, such as elasticity and gravity to your *Max* meshes, turning them into bouncing rubbery objects. Wild deformations, wobbles, and twists are only a plug-in away.

Once the pride and joy of the Mac platform, Electric Image will bring its *Animation System*, *Broadcast*, *3D Modeler*, and *Radiosity Renderer* to the Wintel platform this summer. This complete animation package includes custom lighting effects such as lens flares and volumetric lighting, and other features such as Inverse Kinematics and multiprocessor capabilities. This may pose a serious threat to the NT rendering market currently dominated by *Softimage* and *3D Studio Max*.

Sci-Tech Software, developer of *Display Doctor* and *UniVBE*, was showcasing *SciTech MGL 3.1*, a 32-bit graphics library—used in the development of *WinQuake*—that allows developers to mix graphic subroutines for tweaking games for optimal performance.

SOUND BLASTED

With manufacturers opting for the PCI bus and DirectSound API compliance, Creative Labs' domination of the sound-card market is surely challenged. In fact, the mantras have been: "Down with Sound Blaster compatibility" and "3D positional sound."

Riding high on their 3Dfx-laden Monster 3D video card, Diamond's Monster Sound card was among the first generation of PCI-based 3D-positional digital sound cards into full effect. (See the review on page 88.)

Oak Technologies' OTI-610 Audio3D chip was up and running, as was Aureal's HRTF 3D positional audio technology. Xitel's XA20 digital sound card—with support for DirectSound, DirectSound3D, and AC'97 specs—is expected by the end of the summer.

Sonic Foundry unveiled *CD Architect*, a plug-in to *Sound Forge v4.0*, providing extensive support for PQ editing, track times, sub-indices, ISRC codes, and printed cue sheets. *CD Architect* can auto-crossfade files, insert silence, and audition the entire virtual CD before burning. If you doubt your hardware, you can enter the test-burn mode to check for underruns and save yourself a Hamilton.

CLASH OF THE TITANS

Although Cyrix was conspicuously absent from the show floor, Intel and AMD tussled for mindshare.

Along with its arcade-platform initiative (featured in this month's Nuggets), Intel had much MMX love going on. Angel Studios' MMX/3Dfx hovercraft racing simulator and Mango Grits' flight sim had everyone excited.

AGP was also present, with ATI headlining its new 3D Rage Pro accelerator. However, the 440LX PCIset release date has slipped from Q3 '97 to Q1 '98.

AMD's K6 was fired up and ready to go toe to toe with Intel's new P233 MMX offerings. Coming in at 200MHz and 233MHz, AMD had a variety of games running on their processor, to help ease developers' fears of incompatibility.

>20

< 1997 CGDC continued

VR IS DEAD. LONG LIVE VR

Rendition's stereoscopic version of *Quake* looks amazing. Using wireless LCD glasses from H3D, stereo *VQuake* reclaims the crown from *GLQuake* as the most impressive version of the game. Although Rendition's Vérité is the only 3D chip to provide built-in support for stereo glasses, H3D is working on an external adapter box to enable its glasses to work with any 3D card. Not to be outdone, SimulEyes was showing a stereoscopic version of *MDK* on its LCD shutter glasses (also using a Rendition card).

ATI and nVidia were each offering next-generation 3D accelerators, both of which look darn impressive. (See this month's Third-Generation 3D cards feature on page 44 for details.) Rendition was also showing the V2200 in a few of its demo machines, while Matrox demonstrated its Rainbow Runner media add-ons for the Mystique.

S3 demo'd *GoMan*, a new Direct3D game, on its ViRGE/GX2 card. Although frame rates were marginally higher than on a 3Dfx card, S3 sneakily used Direct3D's stretch features to scale and smooth a low-res 320x200 image up to 600x400, resulting in the higher frame count.

Speaking of 3Dfx, they were everywhere. Just about every booth with 3D software content was powered by a Voodoo graphics chipset. Impressive Voodoo titles included the arcade hit, *SF Rush*, and *Mace*, a 3D fighting game. PowerVR had a sizable presence as well, showing off new PowerVR-native versions of games such as *Pod* and *WipeOut XL*.

By far, the most bizarre display at the CGDC was from Floating Images. By hanging a semitransparent mirror in front of the computer screen and blocking your view of the bottom half of the screen with a solid mirror reflecting into the other, they produced images that appeared to float in air. ▯

Cyrix and Digital Attack Intel

Intel has been slapped with two lawsuits—in a 24-hour time frame—from Cyrix and Digital Equipment. Both companies accuse the chip maker of stealing technologies incorporated into the Pentium, Pentium Pro, and Pentium II line of processors. In addition to financial compensation, Cyrix and Digital are demanding an injunction prohibiting Intel from shipping any of the processors named in the dispute.

"It was difficult to accept that Intel is making unlawful use of our technology," says Robert Palmer, Digital's president and CEO, "but the significant performance gains Intel has achieved over the past few years are a direct result of using our technology."

Patents were issued to Digital between 1988 and 1996 for technologies such as cache management, branch prediction, and high-speed instruction processing. According to Palmer, "Intel's deliberate infringement of Digital's patents has contributed to Intel's monopolization of the x86 and high-performance processor markets."

Cyrix's suit—seeking injunctive relief with unspecified damages—was filed the day after the company was granted two patents, one for microprocessor power management and another for a process that allows the register to be dynamically renamed. Cyrix claims the core technologies of these patents were also integrated into Pentium designs.

Both suits were filed by the same New York law firm, leading industry observers to speculate whether the suits were coordinated to tag-team Intel. Both Cyrix and Digital deny the allegations.

If you're playing it safe and stockpiling a reserve of Pentium II chips, don't bother. Intel owns myriad processor and technology patents, so it's unlikely Digital and Cyrix will get their injunctions. More likely, Intel will countersue both companies, tying up the dispute in court for years. ▯

Floating-Point Bug Discovered in Pentium II and Pro CPUs

A hardware bug affecting the Pentium II and Pentium Pro processors—originally posted on Robert Collins' Intel Secrets web site—has been confirmed by Intel. The "flag erratum" is an error in the process of converting floating-point numbers into integers. According to Intel, when an application attempts an invalid conversion, the hardware should return a defined value and signal the exception. The erratum doesn't signal the exception. Plain-vanilla Pentiums, MMX-enhanced Pentiums, and AMD's K6 are immune to the error.

While this problem is reminiscent of the fiasco leading to the mass recall of the first Pentium chips—which cost Intel approximately $475 million—industry sources aren't overly concerned. In fact, influential gaming companies, such as Electronic Arts, SegaSoft, and id Software, were quick to dismiss the erratum as insignificant.

"We work in low precision and leave exceptions masked," says id Software's John Carmack. "The Pentium Pro and Pentium II processor flag erratum has no impact whatsoever on *Quake*."

Intel admits it is are continuing to work with software developers, putting applications through a rigorous "checkup" of sorts, ensuring they are not affected by the erratum.

"Most software checks for the boundary conditions don't use floating-point processing or don't rely on the flag," says Intel spokesman Howard High, "and as such, we are confident this problem can be fixed in software."

High explained that if and when software fixes become necessary, consumers will be able to download application patches from Intel's web site.

Intel is in the process of correcting the erratum for the next stepping (a change in the physical chip) of the processors. However, High admits "Not all errata can be addressed in silicon," adding "by the time you go through validation and move into volume production, it's at least a six month process." When asked about the possibility of a recall, High emphatically told *boot* that "No recall is planned, nor is one necessary."

"Even though the complexity [of multimedia transistors] continues to rise pretty rapidly, each processor is a little better when it comes out, but not perfect," says High.

This bug is the 62nd known erratum for the Pentium Pro, and the 25th for the Pentium II. ▯

pentium II
intel

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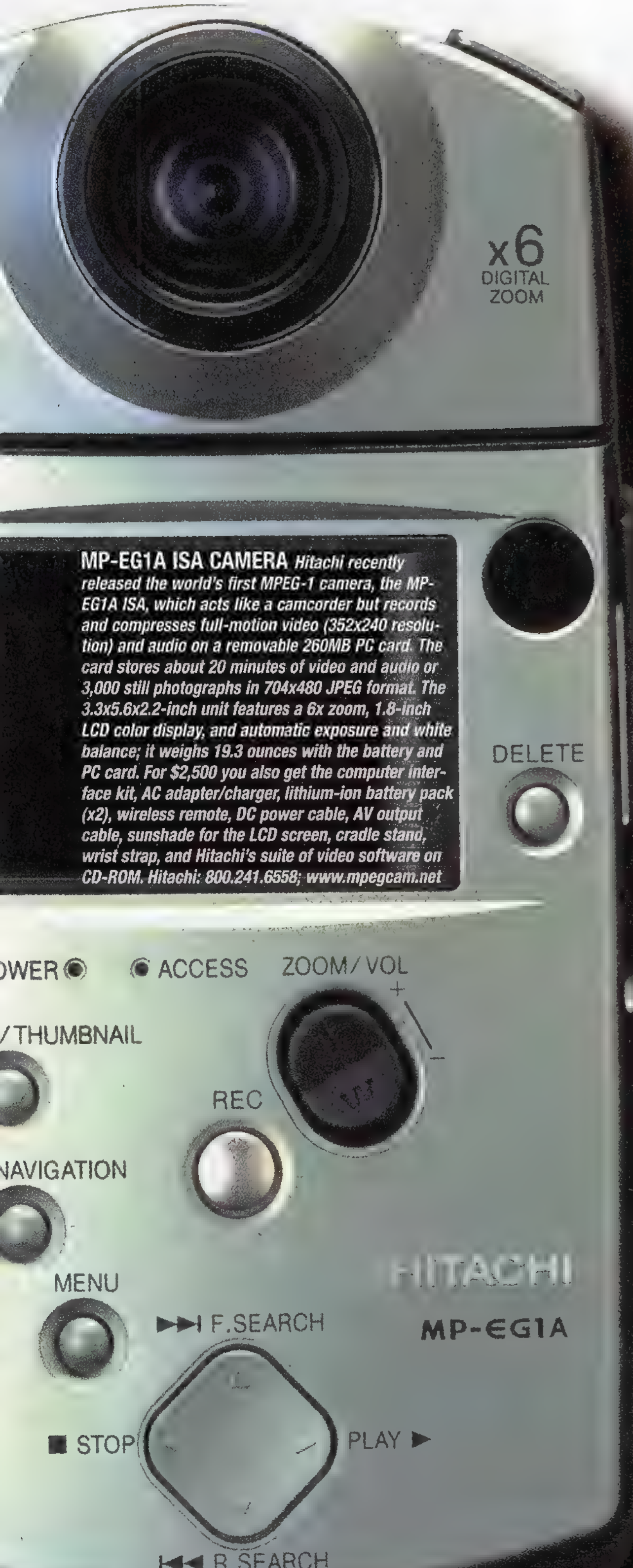

MP-EG1A ISA CAMERA *Hitachi recently released the world's first MPEG-1 camera, the MP-EG1A ISA, which acts like a camcorder but records and compresses full-motion video (352x240 resolution) and audio on a removable 260MB PC card. The card stores about 20 minutes of video and audio or 3,000 still photographs in 704x480 JPEG format. The 3.3x5.6x2.2-inch unit features a 6x zoom, 1.8-inch LCD color display, and automatic exposure and white balance; it weighs 19.3 ounces with the battery and PC card. For $2,500 you also get the computer interface kit, AC adapter/charger, lithium-ion battery pack (x2), wireless remote, DC power cable, AV output cable, sunshade for the LCD screen, cradle stand, wrist strap, and Hitachi's suite of video software on CD-ROM. Hitachi: 800.241.6558; www.mpegcam.net*

NAVIGATION SYSTEM *Road warriors can drive their cars into the next millennium with Alpine's NVA-N751A navigation system and CVA-1000 system control monitor/receiver. The $1,300 CVA-1000 is a 5.6-inch active-matrix color LCD monitor and remote control that fills a DIN-sized dashboard space and automatically moves into viewable position at the press of a button. Control a CD changer, tuner, security system, and other components from the CVA-1000 at the same time that you monitor your location on the screen using the $1,800 NVA-N751A. This voice-guidance navigation system guides you verbally, and calmly as you follow your path on the dashboard monitor using region-specific CD-ROMs. We bet the Batmobile has one.* ***Alpine: 800.257.4631; www.alpine1.com***

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HARDBODY HANDHELD PC *You can drop, kick, drag, and soak Texas Microsystems' Hardbody handheld PC and it will still be ready to crunch data. Based on The Grunt, a PC built for GIs in combat, the $3,975 Hardbody holds a 80486DX4 75MHz processor, 8MB of RAM (expandable to 32MB), and a 260MB hard disk, and runs Windows 3.11 with pen extensions. The 64-level grayscale LCD display measures 6 inches on the diagonal with 2048x2048 resolution. The Hardbody measures 6.375x9 inches by 2.125 feet and weighs 3 pounds, 4 ounces with battery—perfect on the battlefield or the construction site.* ***Texas Microsystems: 800.627.8700; www.texmicro.com***

RELIEFBAND *It looks like a wristwatch but it's closer to Pepto Bismol or Tylenol in function. In the FDA-ruled United States, Maven Laboratories' ReliefBand is marketed as a drug-free, noninvasive system to relieve the symptoms of general discomfort in the wrist and forearm. Abroad, it's sold as a nausea-control device. Worn on the underside of the wrist, the ReliefBand works by sending mild electric pulses to your nervous system, "blocking signals of pain and discomfort," the company says. The device is powered by three zinc air 1.4V-type 312 batteries (hearing aid batteries) and is available in the United States by prescription only for $295.* ***Maven Laboratories: 888.668.6648***

RELIEFBAND
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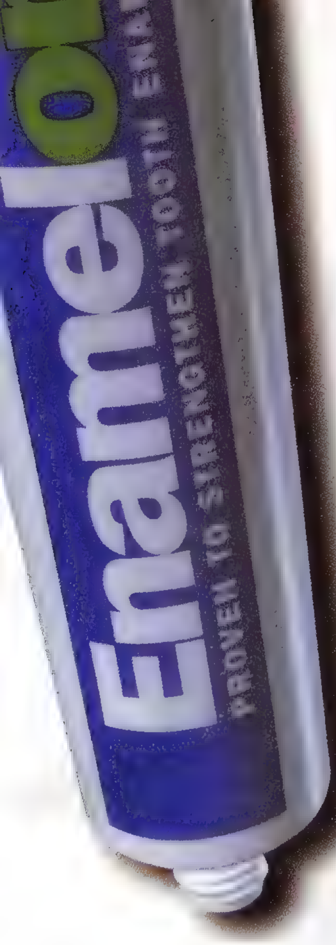
PURE LUST



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RADIOPHONE *High in the "Why didn't I think of that?" category is Blaupunkt's Radiophone, a combination of car stereo and cell phone. The Radiophone uses a cellular chipset from Lucent Technologies to work with the GSM (Global System for Mobile Communications) digital cell-phone standard popular in Europe. The good news: Punch in telephone numbers using the tuning buttons and a microphone on the dashboard allows hands-free conversation—you hear the person you're talking with over the car stereo speakers. The bad news: Blaupunkt has not scheduled the Radiophone for U.S. release... yet. Blaupunkt: 800.950.2528; www.blaupunkt.com*

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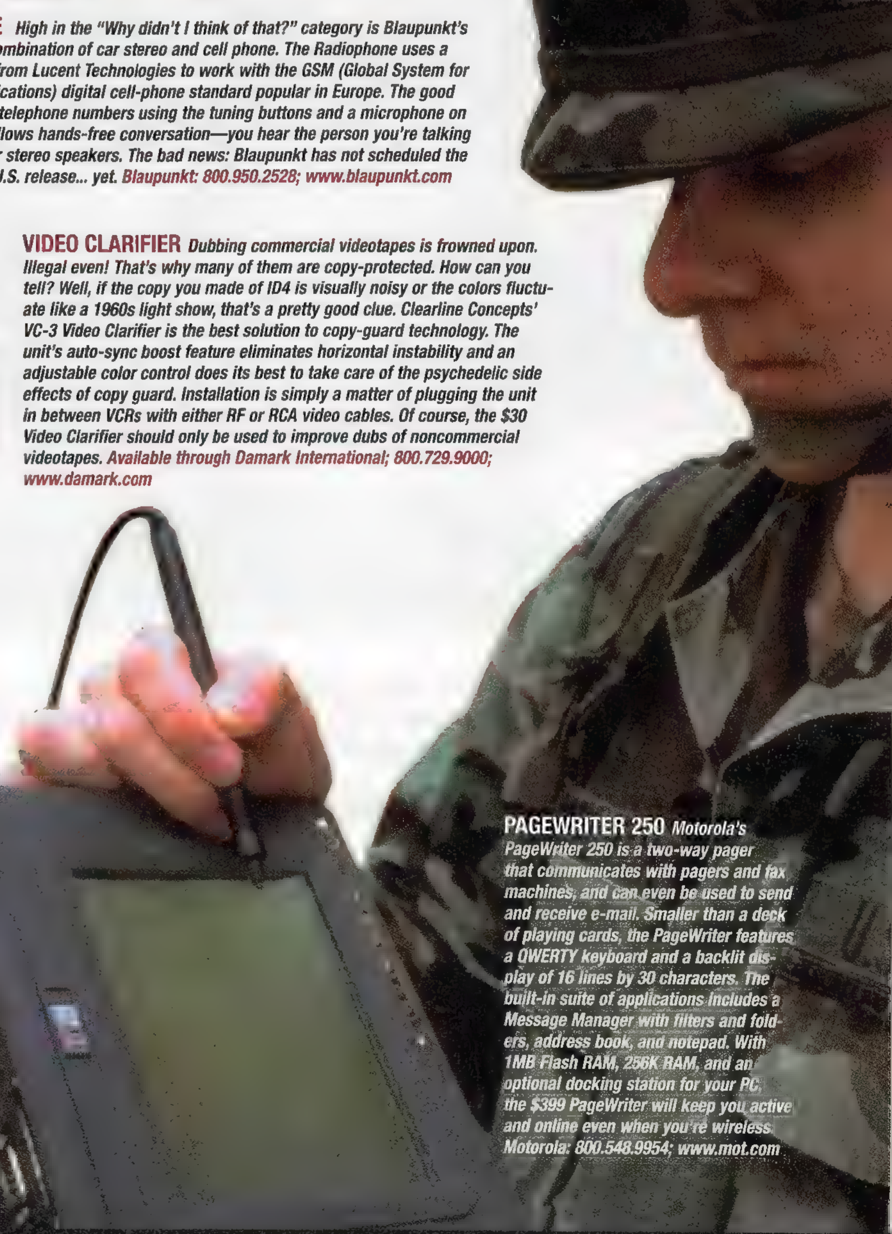
Sonic Super Ear



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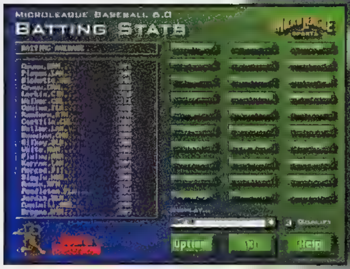

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Product Information Number 239

GAME THEORY

WITH T. LIAM MCDONALD

Flight School in Session

CLIMB THE **FLIGHT LADDER** AND **LEARN** YOUR **LESSONS**

There's a pecking order in the world of flight sims—a class system, if you will. At the bottom are games that qualify as *Doom* with wings: arcade action in a cockpit. Here you have *Comanche, A-10 II, Air Power,* and similar titles. They don't model actual flight, but deliver fast-paced gaming with simplified controls. The easiest way to spot one of these is by rudder effects. If you apply rudder and the plane spins as if it's on a turntable, it ain't a real sim.

Then there are midlevel sims, such as *Jetfighter III, US Navy Fighters,* and *ATF.* These try to handle more complex elements such as drag, stalls, turning radius, and control functions. They invest programming time and processor power to create the illusion that this is an actual airplane, but they don't build a lot of sophisticated calculations into details such as the physics of moving through space, how radar tracks an enemy, or how fuel burns.

At the top, there are sims that work hard—and make the processor work hard—to create a complex set of equations and variables approximating real-world conditions as closely as possible. These include *Su-27, EF2000, Longbow,* and *Back to Baghdad* (a flight model without a game). Elaborate elements figure into the equations that govern flight, such as the enigmatic ground effect (the effect of air pressure and ground temperature on flight), variable rates of fuel usage, performance at different altitudes, and so on.

The Wright Brothers' **innovation** was not the **idea** of the airplane—which had **existed** for some time—but their **design** of the warped wing.

These flight models dynamically calculate lift, weight, drag, and thrust: the four fundamental forces of flight.

The Wright Brothers' innovation was not the idea of the airplane—which had existed for some time—but their design of the warped wing. Viewed from the side, a wing is not symmetrical: the air flowing over the top of the wing has farther to go than air flowing under the bottom. When the airstream hits the leading edge of the wing, it splits over top and bottom. For this air to meet on the trailing edge of the wing, the air flowing over the top has to move faster. The faster air going over the top has less pressure than the slower air going under the bottom (this has to do with Bernoulli's' Law), so the air going under the bottom pushes upward, creating lift. By changing the angle of attack, meaning the angle of the wing, more lift is generated and the plane climbs.

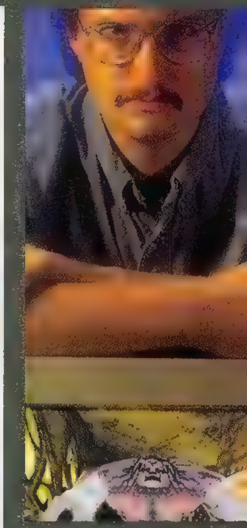
To make air flow over this wing requires thrust. An engine drives the aircraft through space, generating the airflow that causes the lift. More thrust means higher speeds.

The final elements of the core flight equation are drag and weight, which are pretty simple concepts. An object moving through space has weight, therefore gravity pulls it toward the Earth. This object also has mass, which causes friction, and the airflow works against this to keep the plane airborne. The airframe, cockpit, engines, and weapons are all fighting the smooth flow of air around the plane. Heavy wing-mounted munitions are bulky and cause serious drag, reducing speed and performance, and increasing fuel consumption.

The first sims rarely calculated even these basic elements with any accuracy. As sim veteran Andy Hollis, creator of *Gunship, MiG Ally Ace,* and *Longbow,* observes, "The thing that made a sim in the early days was the ability to go anywhere in the world and have completely free movement. We couldn't do accuracy very well; we were lucky to get any kind of reasonable flight equation in there at all. But as it became possible, it became expected. The audience started asking for it."

"Realism" is tricky. In truth, there's no truly realistic sim, just approximations. When a reviewer says a sim is "very realistic," it's a qualitative term meaning "it seems realistic for this type of game." It's also qualitative because most game writers have never flown an F-16 or Su-27: we have to go by reports of how they handle.

The movement toward realism meant the addition of various factors (think of them as modifiers) to the base equations of lift, drag, weight, and thrust. These equations added layers of detail and realism, providing modifiers for various types of heavy drag ordinances, the effect of the weight of the fuel load on performance, the effect of altitude on fuel consumption, the properties of different types and models of engines, weather effects, wind effects, and so on. There are many complex physical elements at work in a flight model. Air gets thinner at higher altitudes, meaning the engine can push faster and use less fuel. A full weapon load cuts how tightly you can turn. Wind sheer pushes your plane around on takeoffs and landings, requiring control adjustments.



T. LIAM MCDONALD is the all-knowing god of gaming. His mother still can't believe that he plays games for a living.

The network of data that goes into modeling these physical properties requires a mountain of equations and calculations. This is the stuff you never see, but it's what gives a good simulation a sense of real-world physics. *Flight Unlimited* and *Su-27* use countless equations to create a complex flight environment. *Silent Thunder: A-10 Tank Killer II* or *Air Power* have few. **b**

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When **Push** comes to **Shove**

INFO DRANO NEEDED TO UNCLOG **DATA CHANNELS**

Recently I came across an editorial in the Journal of the American Medical Association (JAMA) proposing the regulation of medical information on the Internet. “Technical glitches aside, when it comes to medical information,” they wrote, “the Internet too often resembles a cocktail conversation rather than a tool for effective health-care communication and decision-making.”

Frankly, I have wonderful conversations over cocktails. In fact, I'm more relaxed in cocktail conversation than when I'm reading JAMA and its stuffy, self-righteous, we-know-better-than-you-about-human-health rhetoric. This is not to say the AMA doesn't have valuable scientific research on its resumé or that JAMA never prints insightful editorials. The real issue is the distribution of power.

The editorial attempts to discredit the Internet as “the world's largest vanity press,” and goes on with “novices and savvy Internet users alike can have trouble distinguishing the wheat from the chaff, the useful from the harmful.”

Obviously, pathetic surfers such as us are incapable of filtering information for ourselves. We can't research multiple perspectives (and hidden agendas) to find the truth about a subject. This arrogant maneuver is a blatant attempt to subvert the masses, as television has done for years, into thinking we're unable to make responsible decisions ourselves (or convincing us that we're too busy to bother). It strategically reinforces the notion that we need someone else (usually someone richer, more white, more male, and with more stock in Warner Brothers) to tell us how to live our lives.

> It's **imperative** at this point to ask the **question** no one **wants** to answer: **How** is this revolutionary and **why** is this necessarily **better?**

The JAMA suggests all postings list authorship, attribution of sources, disclosure of site “ownership,” and the date of posting as a regulatory standard.

I don't see this disclosure on TV ads for aspirin or hear it on radio ads for Midol! I don't see this disclosure in newspaper articles, magazine editorials, films such as *Drugstore Cowboy*, or the TV show *ER*. These media are just as susceptible to misinformation as the Internet. Being wealthy enough to run an ad agency or buy airtime does not qualify someone as intelligent, ethical, or responsible.

But what is most alarming about this editorial is not the techno-ignorance of the authors. It signifies a much larger problem: the inevitable shoving of Push technologies down our throats.

Regulation and Push go hand in hand.

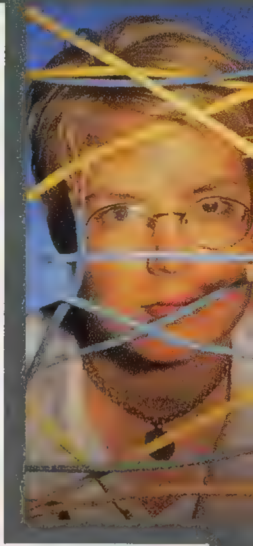
It seems odd that *Wired*, the anti-censorship champion of free speech on the Internet, set the PR ball rolling with its yummy Push cover feature in March. *Time* followed by selecting Marimba's Kim Polese as one of the 25 most influential people. The media is serving us push on a plate, with all the parsley flakes it can gather to make it look appetizing. Both *Wired* and *Time* have a vested interest in fewer people controlling more media, despite corporate “commitments to journalism” and proactive liberal masks. Mainstream media wants us to believe that Push-technology companies such as PointCast and Marimba will revolutionize the web with the miracle of broadcast models.

“The information harvest is brought to users' desktops without any more effort than the selection of a few preferences,” wrote Gary Welz in an *iWORLD* developer column about Push technology. “This is a dramatic evolutionary leap from the hunter-gatherer days of surfing the net for each morsel of information.”

It's imperative at this point to ask the questions no one seems to want to answer: How is this revolutionary and why is this necessarily better?

In fact, it is neither.

Push technologies are about as revolutionary as sending in a subscription card to Imagine Publishing. You fill it out, check off which magazine (information)you want to get on a regular basis, and it arrives every month. Why is Push better? Well, it's better for the conglomerates because you are releasing control over what you see. Who needs to scavenge and perchance find an enlightening story about a subject you'd rather ignore (like sexism, ha!) when you could just as easily get homogenized content à la *Melrose Place* dumped into your CPU? We are safe in sheepdom, letting them tell us what we want to hear.



SHEL KIMEN (kimen@well.com) has spent more time online than is reasonably healthy for one person and dreams in hypertext.

The Internet's tour de force is its potential for individual empowerment on a magnificent scale. Push technologies strategically undo what the Internet has accomplished by controlling information distribution so that the few have power over the many on the web, much like the entertainment industry has over us in our living rooms. It is doing this under the guise of convenience. Regulation—such as JAMA proposes—and Push technologies that broadcast content seamlessly to our desktops are just the opposite.

This is not to say that Push is entirely motivated by an Orwellian agenda of mind control. It is merely a call for a reality check in the wake of media hype. Look before you leap, or you might get pushed out of the way. No joke. **b**

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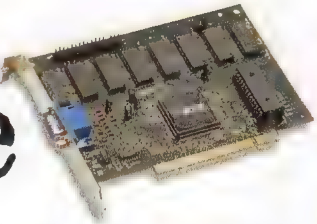

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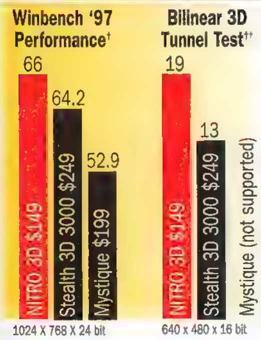

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Product Information Number 307

FAST FORWARD

WITH TOM HALFHILL

TOM HALFHILL is a senior editor at *Byte* magazine and the author of two computing books. He first became interested in computers during the disco era.

Why **Java** Matters

THIS THING HAS THE **POTENTIAL TO CHANGE** THE ENTIRE **COMPUTER INDUSTRY**

The three stages of hype: First, a new product or technology explodes on the scene and is hailed as the greatest thing since sex. Second, the industry's contrarians sagely denounce the hype, but often dismiss the new invention without analyzing it very closely. Third, the now-tarnished invention either disappears in disgrace or is rediscovered by anticontrarians who point out that some of the hype wasn't undeserved after all.

I've seen this cycle repeat itself countless times in the past 20 years. I've even seen a few cases (graphical user interfaces, local-area networks, the Internet) in which the new thing was *hyper*-hyped and not only lived up to the original hype, but far surpassed it.

Stage 1 of the hype cycle happens because it takes a lot of manufactured excitement to raise a new product or technology above the raucous background noise of the computer industry. Stage 2 happens because many critics seem unable to recognize the potential of something genuinely important unless it lands in their laps fully mature and neatly wrapped in gift paper. Stage 3 happens because something that's genuinely important rarely appears that pretty at first. Usually it enters the world looking a little rough and immature.

Critics can find a lot of flaws in **Java.** So can I. But Java is one of those **hyper-hyped** technologies that could actually **surpass** its hype.

Java is currently rolling through stages 1 and 2 of the hype cycle. Anything that generates as much hype as Java is sure to set off the contrarians' alarm bells. But in the case of Java, there is substance behind the hype. Java—or at least, the most important concept of Java—has the potential to change the computer industry as radically as did graphical user interfaces, networking, and the Internet.

The most important concept of Java is that software developers and users needn't be slaves to proprietary platforms. You might not think you're a slave now, but you are. The software you buy determines which operating system you have to run and which CPU your computer must have, and vice versa. You're not free to mix and match. You're not free to buy the best application software, the best operating system, and the best computer. One of those choices dictates the other two.

Suppose you could buy any computer and operating system *without* replacing your software. Suddenly you'd have freedom to acquire a faster, more versatile, and less expensive system. If it's a notebook, it could be lighter to carry and have longer battery life, too.

Sounds cool, doesn't it? But I can see your eyes narrowing. "Where are all these better choices?" you ask. "What alternatives are you talking about? Macintosh? PowerPC? Unix? Sparc? NeXT? Some choice!"

A fair question. One answer is that other operating systems really do have some advantages over Windows, and other CPUs really do have some advantages over the Intel x86. Most people don't bother to compare because they automatically choose the platform that runs the most software. Right now, that platform is Wintel. It's a choice we've all made, and it's perfectly logical—based on how things work today.

What if the rules changed? What if your choice of software didn't determine your choice of OS and CPU? Not only would *you* have more freedom, so would software developers and hardware engineers. Soon we'd have even more options, because there'd be a wide-open market that doesn't exist today. The market for alternative platforms is extremely limited now because 90% of users naturally prefer the platform that runs the most software. Remove that bottleneck, and we'll witness an explosion of innovation.

Example: Digital and Advanced RISC Machines have a remarkable CPU called the StrongARM. It's faster than a Pentium, maybe even as fast as a Pentium Pro, but it costs only $49 and burns less than one watt of power. P-Pros cost $400 to $1,000 and burn more than 30 watts. With a StrongARM, somebody could build a notebook that outruns the fastest Pentium-based notebooks while costing hundreds of dollars less, with a much longer battery life. Too bad it won't happen. StrongARM doesn't do Windows.

I'm not bashing Windows. I'm bashing all platform architectures that chain application software to the OS and the OS to the microprocessor.

Java can break those chains. Programs written in Java run on a Virtual Machine (VM) that insulates applications from the underlying operating system and CPU. Developers can write a program in Java that runs without porting or recompiling on any platform that has a Java VM. Almost every platform already has a Java VM, or will by the end of this year. That makes Java a true cross-platform standard. Some call it a "universal platform."

Critics can find a lot of flaws in Java. So can I. I've been writing my own Java programs (for a small example, see **http://dev5.byte.com/bonus/inflation.html**) and I recognize its shortcomings. But I also realize Java is a 1.x product that's rapidly maturing. Java is one of those *hyper*-hyped technologies that could actually surpass its hype in time.

Even if Java fails, the concept won't die. Platform-independent software has so many advantages for users and developers that I'm convinced it'll succeed someday. Once those chains break, there will be no turning back. **b**

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MEDIA ON

Product Information Number 236

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Ted Waitt, *Gateway 2000's president and co-founder, turned a fledgling* ***farmhouse*** *operation into the fifth* ***largest*** *PC supplier in the world by* ***aggressively*** *bringing new* ***technology*** *to the home market. Waitt explains why he's the*

Mail-Order Mave

boot ***Who is the typical Gateway customer?***

Waitt Our core customer is very experienced with PCs; they do a lot of research before they buy.

That customer has taken us into two other segments. One is major corporations. We typically get in by selling to this experienced computer user and he brings Gateway into the business. So we're doing about 35% to 40% of our business with major corporations, governments, and universities. That same core enthusiast, or experienced customer, also influences the first-time PC buyers and new computer users, because when first-time buyers ask somebody who knows before they make a purchase, in many cases that person recommends Gateway.

The typical Gateway customer is on about their sixth or seventh or eighth computer and knows what they're looking for.

boot ***What was your own first PC?***

Waitt A Panasonic Executive Partner, this 15-pound portable computer with a built-in printer, a gas-plasma screen, and a 286 processor. I left it in my car one night and it got really cold out, which froze the plasma screen. It would have cost thousands of dollars to fix the darn thing, so I never used it.

boot ***How long ago was that?***

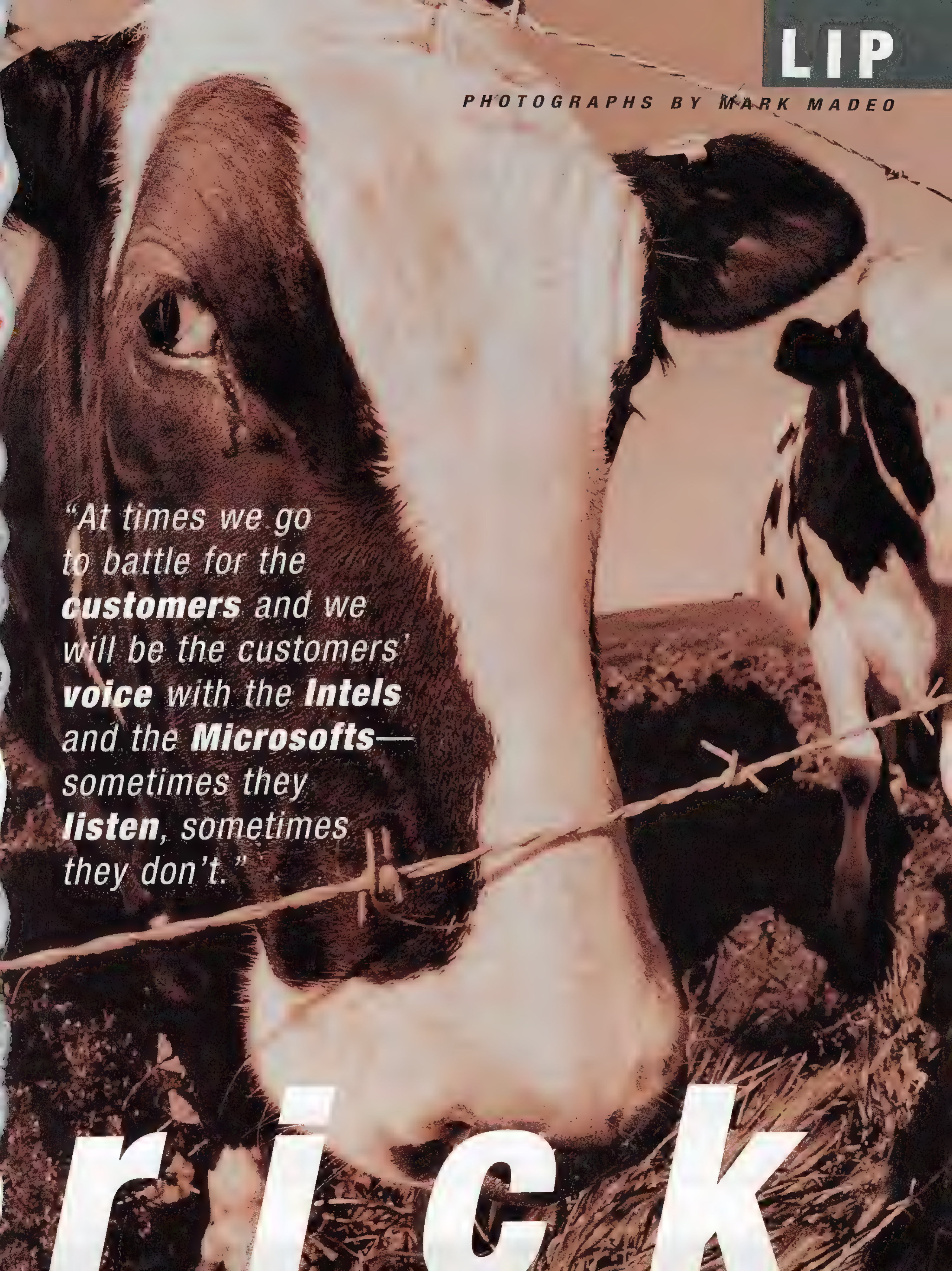
Waitt Ten years ago. After that I built my own!

boot ***Is that how Gateway came into being?***

Waitt A guy I worked with in Iowa by the name of Mike Hammond came back here to Sioux City and we started our computer business. We were located in a farmhouse at the time, working out of the main floor, which was actually the office of my dad's cattle business. So we had a free office and we lived upstairs. At three o'clock in the morning, if a truck came, we'd have to unload the cattle trucks to pay our rent. [laughs] *And* we sold computers.

boot ***Gateway started off small and is now the No.5 seller of PCs. What do you think of companies trying to do the same thing?***

Waitt There are a lot of good companies out there. The No.1 company in the PC industry is not IBM or Compaq—it's "Other." Most PCs are sold by small entrepreneurial firms. We was one, as we like to say. And so we spend as much >



LIP

PHOTOGRAPHS BY MARK MADEO

*"At times we go to battle for the **customers** and we will be the customers' **voice** with the **Intels** and the **Microsofts**—sometimes they **listen**, sometimes they don't."*

rick

LIP

"The **Pentium II** is really does-something-for-every

Role Playing

boot ***If you were running Apple, what would you be doing now?***

Waitt I'd probably be getting drunk right now! [laughs] If I were running Apple two years ago, I would have broken the company into three separate companies: a software company, a licensing company, and a computer company that manufactured computers under the Apple brand name. I'd realize Apple is not a religion; it's an operating system and an architecture.

boot ***Do you think they're going to survive?***

Waitt They'll survive. They've got too much brand equity and too many technology pieces to fade completely into oblivion. The question is, What do they become? I don't understand it. I don't know if anybody understands what they want to be or what they really are. I think people feel hurt and let down that they haven't lived up to the potential they had.

---

time looking back at smaller companies as we do looking at the larger companies, because we don't want someone to out-Gateway Gateway.

Given that, we've also learned a lot from our experience as a smaller company. When you get to our size, you have to control your quality much better than when you're a smaller company. You are, by nature, not as fast and flexible because of processes put in place to ensure quality that didn't exist when you were a smaller company. Very few smaller companies in this industry have that because, especially if they're a newer company, they haven't been burned by the mistakes they've made. It takes risks to make a mistake. You learn from it and move on.

boot ***How did Gateway become so big?***

Waitt Just luck.

boot ***Were you expecting this sort of success when you started?***

Waitt We realized there was tremendous potential. We tried to be fast and bring our customers the latest technology before any of our competitors. We were fortunate to have a great team of people who could work together, had a passion for customer satisfaction, and who had fun doing what they're doing. That still exists today. I never knew a $5-billion company could feel small, but I feel like we're a small company today in a relative sense.

boot ***When Sony introduced their line of PCs they said they were gunning for No.5.***

Waitt Does that mean they're going after us? [laughs] That'd be very difficult for a company such as Sony—and I know Sony fairly well from working with them on the purchasing side. I know how fast Sony moves, and I know the way they think, and it's very difficult for them to deal with the fast-paced environment of the PC mindset.

boot ***So, is Gateway going after the No.4 position?***

Waitt Our vision is to be the leading marketer of computers in the world, so we're not really planning on being No.2.

boot ***You think Gateway can be No.1?***

Waitt Well, you've got to try for something! The companies that say, "We want to be No.4" are now 40th. So if you don't try to be No. 1, what's the point?

boot ***And when will you be No.1?***

Waitt You can't just say you want to be the biggest. First, you want to be the best, and have the most satisfied customers, and hopefully people's knowledge spreads and you do repeat business. Our forecast shows we can be an extremely large company within three or four or five years from now.

boot ***So you're gunning for Compaq?***

Waitt We have to continue to offer a better product at a better price and better service and support, while not losing sight of what got us where we are.

boot ***There's been a lot of talk lately. Is Compaq buying Gateway?***

Waitt No.

boot ***Is Gateway for sale?***

Waitt No.

boot ***How did the rumors get started? Have you ever been in negotiation with Compaq for the sale of the company?***

Waitt I can't comment on rumors.

boot ***OK... On the topic of acquisitions, Gateway recently bought the rights to Amiga. What sort of response has there been to that move?***

Waitt Well, the Amiga people want to know why we purchased the rights. Amiga has some fantastic technology. It's extremely efficient. And there's the tremendous enthusiasm of folks in the Amiga user environment. The core technology is very compelling.

I like the modularization of the platform and the operating system, the efficiency of the operating system, the pureness and cleanness of the environment, the video technology... there are a lot of good things.

boot ***What about those valuable patents?***

Waitt The Amiga patents were the primary interest initially, but now we're thinking there might be a lot more than just a set of patents.

boot ***What will you do with the technology?***

Waitt We're trying to develop that right now, but the promise of an open Amiga is very interesting.

boot ***Is there an Amiga curse?***

Waitt I don't think so. Look at the people that have had it before us.

boot ***Commodore is gone, Viscorp is dead, Escom AG...***

LIP

the first **no-compromise**, no-need-to-tell-a-story, body **CPU** that's hit the market in a **long time.**”

Waitt Yeah, but Escom was on its way out. Commodore had its own difficulties. Viscorp was looking at a very narrow approach.

boot ***Do you think Gateway leads the customers in terms of introducing new technology or is it the other way around?***

Waitt [laughs] Both. It's not technology for the sake of technology. It should be technology because customers want it. Sometimes customers don't know about technology, so Gateway has to lead that technology to the market because it makes more sense than what was previously available, either offering more capacity, higher performance, or a new feature set or something.

boot ***Have there been instances where Gateway was surprised by customers demanding a feature or a technology?***

Waitt There have been situations, such as with our full-size towers, where we realize that customers really want those big cases with a lot of expandability.

It happens more when we take something away and then realize a lot of people really wanted it.

boot ***What's been the reaction to the new Euro-styled cases?***

Waitt Mixed.

boot ***You sound surprised by that response.***

Waitt To a certain degree, yeah. We take the look very seriously. We were the first to do a gray computer. This was a wild thing. We did this curvilinear design back in 1991 and that went through several iterations. We wanted to tie it together under a common look, keep things fresh with the way our products look and feel, and give a quality feel. We've seen mixed reactions from customers who want open bays, and we're going to do something about it. Some people love them the way they are.

boot ***What do you think about the look and aesthetics of systems such as the Toshiba Infinia and the Sony Vaio?***

Waitt Functionally, I think the Infinia is a very nice product. I like the things Toshiba's done for the consumer market. I don't think Sony did as good a job as Toshiba. Aesthetics play a part in driving sales. Customers should only get the product that looks how they want it to look and what they feel embodies what they are and what their PC means to them.

boot ***How about a cow case?***

Waitt We've talked about doing a cow-based case as part of our anniversary systems. It's more conceptual than practical at this point.

boot ***What Gateway product were you* least *proud of?***

Waitt [long pause]

boot ***We like to ask the tough ones on occasion.***

Waitt This is good ... [laughs] The original TelePath modem was one. We had quality issues with that product. I think eventually we made it right.

A product that I liked and the people in the company loved, was our Handbook product, which was fabulous but not commercially successful. I just don't think we did a good job marketing the product. There wasn't anything inherently wrong with the Handbook. It was a great platform. We didn't stick with it as well as we should have, because I think that formfactor will come back as people decide they don't always need to take everything with them.

boot ***Forgive our memory lapse, but what exactly was "The Handbook"?***

Waitt A 2.9-pound 486 about 9 inches by 6 inches that ran Windows. The last version was 486/50, had a hard drive in it, had a full touch-typable keyboard, black-and-white screen. It was a remote e-mail machine, and it crossed the line of never having to say, "Am I going to take this with me?" You *always* took that product with you because it was so light and mobile.

boot ***Have you seen the Toshiba Libretto 50?***

Waitt It's the same thing, same kind of formfactor. Actually, we had a better keyboard.

boot ***Speaking of keyboards, you used to have a proprietary keyboard. Is that still around?***

Waitt The AnyKeyboard? I don't think so. Some customers loved it, but it created a lot of customer issues with its complex programmability. So, the AnyKey created some problems, although I love the product because it was very functional.

Basically, that product could change *any* key to be any other key. That created issues because some people accidentally reprogrammed their "A" key to be an asterisk instead of an "A." [laughs]

boot ***Sounds risky. DVD is a technology that was thought to be a safe bet. Do you think it's living up to the hype?***

Waitt [pause] No.

boot ***Why is that?***

Waitt The hardware is ready, but Microsoft has been holding back widespread

The Future of the Floppy

boot ***Is the LS120 the next generation of floppy drive?***

Waitt By nature the product is intended to be, but does it become the next-generation floppy? I don't know. I don't believe so. I believe the next generation of removable storage is writable DVD. It just makes too much sense and that'll be where things will go. I think you'll see products like the LS120 drives fill niche-type markets, but will they replace the 3½-inch drive? [laughs] I don't see one thing doing that right now. The Zip drive seems to have the most momentum.

deployment of DVD. That's not a good thing. I think it *will* have great promise when it comes to market. It will probably be supported, but it's going to take time. You have to get the product out there before the software developers will write applications that support DVD. It has tremendous prom-ise because the cost difference between it and a CD shouldn't be that significant. And with the compatibility factor, there's no reason customers shouldn't get DVD. If they cost an extra $100 or less, a lot of people will want DVD and it will take that broad approach for the software to realize its promise.

boot ***Do you find it difficult to work with Microsoft and Intel?***

Waitt At times. Our interests are the interests of the end users. And at times we go to battle for the customers and we will be the customers' voice with the Intels and the Microsofts—sometimes they listen, sometimes they don't.

boot ***Can you think of something that they haven't listened to?***

Waitt Yes.

boot ***And... can you tell us what that was?***

Waitt No. [laughs]

boot ***Are you sure?***

Waitt Well... The Active Desktop from Microsoft.

boot ***What don't you like about Active Desktop?***

Waitt Lack of flexibility.

boot ***Still, you're pretty much stuck with Windows. How many non-Win95 systems does Gateway sell?***

Waitt About 10% of our systems go out with NT, which just surpassed Windows 3.11 in the fourth quarter of '96. Windows 3.11 is now about 5% of our sales.

boot ***Any plans to sell non-Intel-based computers?***

Waitt None right now. We're always looking at what would be a better value to our customers, so we're open to the concept. K6 is very interesting. The technology looks solid. I think we'll ship one.

boot ***What about Cyrix processors?***

Waitt I don't see Cyrix being in as strong a position as AMD is with the K6, because of the technology itself.

boot ***What with all the flavors of Pentium kicking around, Intel is their own biggest competitor. What do you think about their latest, the Pentium II?***

Waitt The Pentium II is really the first no-compromise, no-need-to-tell-a-story, does-something-for-everybody CPU to hit the market in a long time. We see it rapidly taking a large percentage of the market.

boot ***When do you see Pentium II becoming the standard?***

Waitt The question is: When will it get over 50% of the sales? That could happen in 1997. For us it won't happen in the industry until late '98. We typically lead the industry by six months to a year on those types of transitions—just like we did on the 486, we did it on the Pentium, we did it on the Pentium Pro.

boot ***Do you see the SEC design becoming a standard?***

Waitt It's creating some issues right now. But it's a good thing. Intel really knows what they're doing, so what can you do about it? The problem is the chips are changing... the speed of processors and the complexity of the CPUs. And dealing with the heat issues is very complex.

boot ***From your perspective, is MMX an overwhelming success?***

Waitt Its adoption rate was very quick because the price delta between MMX and non-MMX was very small on introduction. For MMX to continue that momentum it has to keep that smaller price delta. If the price delta grows, the question is how much value does it add for an end-user? When you're talking about a product with Pentium II that has MMX *and* 32-bit, you really can't go wrong in terms of the best investment. Like DVD, it will take time for MMX to fulfill its promise because software has to catch up and you have to have an installed hardware base for that to happen.

boot ***When do you expect Memphis to ship? Will OEMs see it first?***

Waitt It will probably ship to both retail and OEM simultaneously. I don't think we'll see the same scenario with Memphis that we saw with Windows 95. I wouldn't advise anybody to wait on purchasing a PC because Memphis is coming out, because it won't be as big a change as you saw with Win95. So Memphis might do better as a retail product than an OEM.

boot ***What do you see as the hottest system for this holiday season?***

Waitt Definitely a Pentium II system with DVD, with 64MB of RAM, an Ultra DMA really fast hard drive, it will have a monitor bigger than 17 inches and it will sell for under $3,000 *with* all the high-speed communications, a very interesting software suite, and a sound system that sounds better than most people's home stereos.

boot ***And this product would be named...?***

Waitt The Gateway something...

boot ***NEC has the PowerPlayer. Will Gateway have an ultimate gaming machine?***

Waitt Sometime in the next six months or so. The internal code name for the product has been BMF.

boot ***And BMF stands for...? Oh. Never mind.***

Waitt BMF actually stands for Best Multimedia Functionality.

boot ***We're sure it does. What "ultimate" system do you use at home?***

Waitt A Destination.

boot ***Is there an application you're particularly looking forward to using on your Destination?***

Waitt The new browser technology. The next version of Netscape's and Microsoft's products combining Push technology with the channel metaphor—this will become very exciting for web users.

boot ***Why do you think Push is exciting?***

Waitt If everybody could have a T3 line in their house, it wouldn't be important. Push technology will allow people to get very close to that type of experience with richer content—audio, video—without having to spend the time online. A big percentage of people just want the information they want and they want it when they want it and they want it now. Push technology allows that.

boot ***What do you think about WebTV seeking to open up the web to a broader audience?***

Waitt I don't see the level of satisfaction with products such as WebTV that we see with our Destination, simply because it's a very limited web experience. Without local storage and an industry-standard browser, WebTV customers aren't getting the full web experience. I don't think people will really use it.

boot ***It's hard to tell if the Destination is ahead of its time or if it missed the window. How's the Destination doing?***

Waitt The Destination is doing well. Customer satisfaction is much higher than even *we* anticipated, with 75% of the people who bought the product recommending it.

Selling the Dream

boot ***What role does the Gateway salesperson play in the purchasing decision?***

Waitt If they do their job right, they know the customer, the customer knows them. They call each other by their first name. And they're the ambassador within Gateway and a contact for that customer's friends, relatives, and circle of people that they hang around with to get that conduit of information back to them.

boot ***Do salespeople have a technical background on all the products they're selling?***

Waitt Good salespeople have strong technical knowledge... and understand the products. Of course, it varies. We have salespeople who have been here for a long time and we have salespeople who are fairly new. They go through an extensive training program. They're expected to understand and be able to communicate the technology, but not necessarily fix problems with that technology. They are expected to understand the needs of a customer and deliver the technology to satisfy those needs.

LIP

Mad Cow Disease

boot ***OK. We have to ask. What's with the cows?***
Waitt What's up with the cows?
boot ***Yeah. What's with the cows?***
Waitt You know, there's an old wives' tale that says when the cows are lying down it's going to rain.
boot ***Ummm… OK. How did the cow thing get started?***
Waitt In one of our original ads we had a field of cows with the computer super-imposed on them in front of the picture. That was the first campaign with our Midwest background. It's become our symbol to not lose site of our roots and what got us to where we are today. It exists as a way to uniquely identify Gateway.
boot ***But don't you ever get sick of the cows?***
Waitt No.
boot ***Never?***
Waitt Of the cows?
boot ***Yeah. Sick of cows.***
Waitt Sometimes I get sick of people buying me spotted-cow stuff. I've never actually purchased anything cow-spotted, but I never get sick of the spots.

People are spending more time with their family, they're spending more time on the web, they're spending less time watching TV. The product has a huge impact on the household. People are tremendously satisfied with it. Clearly we'd like to be doing more volume, but there's a misunderstanding of the category in general and maybe some cautiousness. That's why we think other entrants in the market will actually be good for us.

boot ***What do people "misunderstand"?***

Waitt They think it's something completely new, it's not as simple as saying "Hey, it's a PC with a big screen and a wireless mouse and a wireless keyboard." You can watch TV on it, but you can also surf the web and do everything you do on a PC.

boot ***Compaq's announcement of its Destination-killer—the PC Theater—is your first real competition. How does their design stack up against your product?***

Waitt We've been shipping for a year, so you would have thought it would be far ahead of our product, but it's only marginally different. There are some pluses and minuses about their product.

boot ***Do you think the convergence of the PC and TV will spell the death of the traditional home office, or do you see the Destination as a secondary machine?***

Waitt Typically it's a secondary machine. The primary uses are watching TV, surfing the web, and playing games and educational software. There are some people who use it for business applications. When it's in the conference room it's used for presentations, group work environments—going over spreadsheets, going over numbers, those kind of things. If it's used in the classroom, it's used for educational software, very interactive with a large group of people. Typically it's a group-computing type of environment vs. a one-on-one computing environment. It doesn't replace the PC in the home office and the person sitting there—it is an add-on to that. It gets rid of the contention in the household when there are multiple users and dad has work to do or dad's surfing the net or mom's surfing the net, mom has work to do and kids want to play their games.

boot ***How will HDTV affect the Destination?***

Waitt Depends on how you define HDTV. We look at it more as digital television. The Destination is really the first digital television in the marketplace and we plan to continue that lead.

boot ***What about satellite TV?***

Waitt Satellite TV is a logical extension. We can do a card that accepts satellite input from a dish outside and run it directly to the PC. Been working on that for some time.

boot ***And TV-out? Do you think it will be standard?***

Waitt It doesn't have to become a standard simply because of the TV screen's inability to display the scan rate that a PC cranks out. The people who want it can get it—it's a cheap add-on—but once you get there, what will it look like? [laughs] Not very good! That's what drove us to the Destination conclusion—do a higher-resolution screen because the PC just doesn't handle TV very well. Whether you *need* it to handle TV is the problem.

boot ***What's the most important technology consumers should be aware of?***

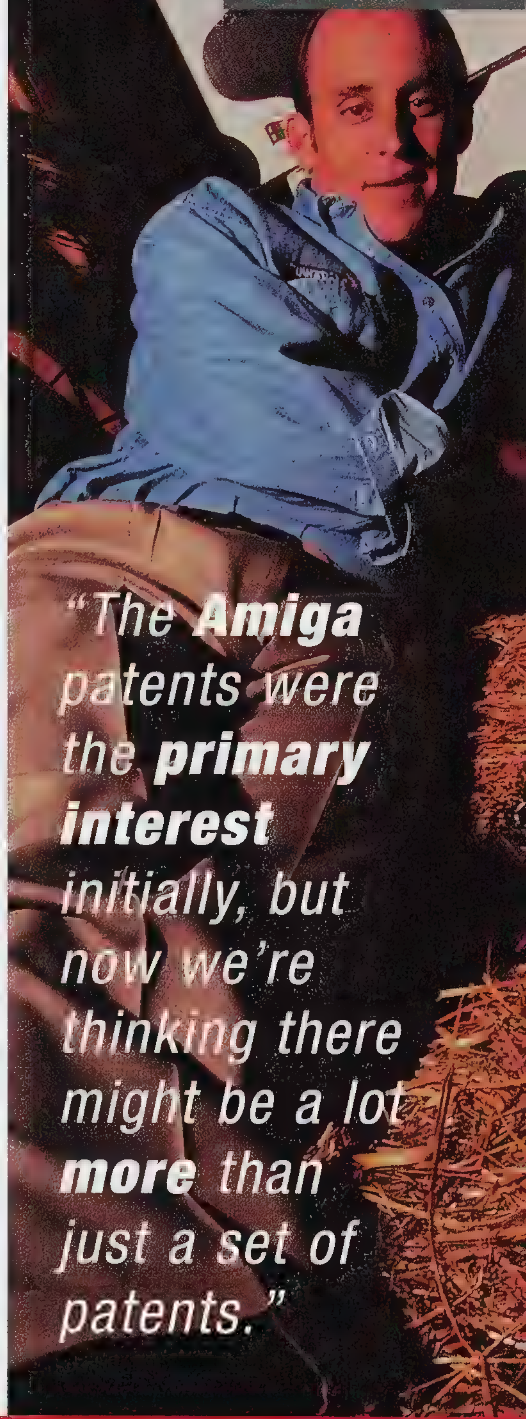
Waitt From a hardware standpoint, Pentium II, higher-speed communications, DVD, larger displays. It's not really a technology thing. It should be something that people want. Higher-quality sound systems, better I/O.

boot ***What would your ultimate PC be—what would it do?***

Waitt Whatever I wanted it to. And be simple to use, too.

boot ***What's the best advice you've ever been given?***

Waitt My uncle, who's a genius, told me never to lie because to be a liar you've got to be a genius—and you ain't no genius! **b**



> "The **Amiga** patents were the **primary interest** initially, but now we're thinking there might be a lot **more** than just a set of patents."

Internet's Impact

boot ***How much does the Internet drive home-PC sales?***
Waitt A lot. The PC is the best way to get on the Internet, and once people get on the Internet and get hooked, it drives PC sales. For us, it's driving PC sales because of our web site and the way people can access it and get more information about our products. So it's a double impact: they need our PCs to get on the Internet and they can also buy our PCs over the Internet.

Shoot to thrill

You don't need a multi-million-dollar special-effects shop to produce your own deep-space shoot 'em-up flick. Just grab your Hi-8 camera, fire up your video capture board, and prepare to edit the next Star Wars—on your desktop.

by Rick Popko

For digital video freaks, it's a fine time to own a PC. Desktop DV applications have been available for a few years, but until recently were stymied by hardware limitations. As late as 1995, affordable video capture boards only captured at a low-quality 320x240, a 4.3GB drive cost more than $1,800, and a 486/66 took a few hours to render a 45-second blue-screen effect.

The rules have since changed. Inexpensive boards such as miro's DC30 can capture high-quality video at 640x480, a 9GB A/V drive sells for what a 4GB drive cost a year and a half ago, and Pentiums are fast enough to render a 45-second blue-screen clip in just a few minutes. Dare we even guess what a 300MHz Pentium II might do with optimized code?

If you're one of those "*Star Wars* changed my life" types and have always asked yourself, "How did they do that?" get ready to put DV into action. The following how-to is your springboard into the basic principles of desktop production. We'll produce a

space-chase scene that includes blue-screen effects, laser shots, and a numbing explosion at the end. All the software and source AVIs necessary to build this scene are on the *bootDisc* (along with a clip of the finished product) and the instructions on the next page tell you how to recreate our movie frame-by-frame, so jump right in.

The Right Hardware and Software

Before you can begin adding special effects, you need the right gear for shooting, digitizing, and editing your source material.

Cameras

To get the best-quality capture to your hard disk, begin with the highest-quality source material. For pros, this means shooting Betacam SP. Cameras of this caliber start at around $10,000 and can easily go up to $50,000, depending on your lens.

If Beta is out of your league, check out a DV camera such as Sony's DCR-VX-1000 ($4,199, **www.sony.com**). This three-CCD camera records 500 lines of resolution at an incredibly high 1,230,000-pixel resolution and has built-in FireWire support. The $2,999 Sony DCR-VX-700 has many of the features and functionality of the VX-1000, but only one CCD chip. Either camera hooked to another FireWire product will give you picture-perfect editing capabilities.

If a DV FireWire camera isn't in your budget, you'll want an S-video camera such as Hi-8 or SVHS.

Systems

You'll need at least a Pentium 90MHz with 32MB to get halfway decent performance from your hardware and software. Shoot, why not jack it up to 128MB. Video production is memory-intensive and you'll kick yourself if you run out of RAM and your software starts using your hard drive as a scratch disk.

Hard disk entry fees start at 1GB. Half a gig may have been enough last year, but today's applications are huge. Serious video capture requires an A/V drive, but if you settle with your IDE, make sure you have a newer drive that doesn't perform thermal recalibration. This process occurs when the drive heads re-align themselves, and although it only takes a fraction of a second, it will almost certainly cause your video to drop frames during playback.

A/V drives are calibrated for video work, so error-correction capabilities are disabled, thermal recalibration is turned off, and mode-page parameters are tweaked for optimal streaming performance. A/V drives generally come in higher capacities and their platters spin faster as well.

Good internal 4GB A/V drives are available from Quantum (**www.quantum.com**) and Seagate for around $750. Better still, if you want even greater performance and throughput, buy two 4GB A/V drives and stripe them using Windows NT 4.0's NTSF striping utility. When you stripe two drives, you essentially achieve twice the throughput, because the data is split and pingponged between drives. Striping also makes your computer see the two drives as one, so you get to work with the full 8GB.

Capture Boards

We're assuming that you don't need broadcast- or VCR-quality playback, so we'll skip over professional-level solutions. To digitize for CD-ROM or web playback, you'll probably want to use an MPEG or wavelet compression board. Check out Real Magic Producer from Sigma Designs ($2,995, **www.realmagic.com**) and Broadway from Data Translation ($995, **www.b-way.com**). These boards capture in what's called "editable MPEG," meaning they capture key frames and save the file as an AVI so it's readable in an editing program such as Adobe *Premiere*.

When you've finished editing, use a conversion utility to transcode and compress the AVI into an MPEG file for full-screen CD-ROM playback. Another option is the new Wavelet algorithm. Its quality is outstanding, and best of all, you can play back Wavelet video without hardware acceleration. Check out the Wake from Digital Video Arts ($995, **www.dval.com**), and the Smart Video Recorder III from Intel ($199, **www.intel.com/imaging**).

If you simply want to play back movies from your computer, all you need is a no-frills board. For budget boards, we recommend the QuickVideo from Alaris ($369, **www.alaris.com**); the FPS/60 from Fast Electronic ($499, **www.2fast4u.com**); the VideumConf Pro from Winnov ($299, **www.winnov.com**); and the $329 miroVideo DC1 Plus from miro.

Software

Hobbyists creating DV at home can do without an expensive editing program capable of real-time effects. An off-the-shelf program such as Adobe *Premiere 4.3* ($795, **www.adobe.com**) should suffice. Other good programs include *Video Action Pro* from Star Media ($499, **www.videoaction.com**), and Ulead's *Media Studio Pro 5.0* ($349; **www.ulead.com**).

For a larger library of effects, you'll need software to augment your basic editor. Adobe *Photoshop 4.0* ($895) lets you import video clips for painting in effects such as laser beams and lens flares. *Ultimatte Ultimatte* ($1,495, **www.ultimatte.com**) is a professional compositing plug-in for *Premiere*. Though you can do basic compositing within *Premiere*, the *Ultimatte* plug-in gives you more precise controls for blue-screening effects. *VideoCraft* ($100, **www.andatech.com**) is a stand-alone special-effects package that lets you morph, warp, and distort images. *Pyromania I* and *II* ($140 each/$199 both, **www.vce.com**) are two CD-ROMs chock-full of royalty-free explosions. All the explosions were shot on 16mm film and transferred to disc as a series of 640x480 TGA files. MetaTools' *Final Effects* ($199, **www.metatools.com**) is a *Premiere* plug-in suite of customizable effects and filters including fire, smoke, rain, bubbles, color shifts, and distortion.

Our Toolbox

Here's the gear we used to produce our project.

Hewlett-Packard Vectra Pentium 166MHz
48MB RAM
1.5GB IDE hard disk
Panasonic 6x CD-ROM Drive
Matrox Millennium graphics card
Adaptec AHA 3940UW dual-channel SCSI card
Micronet 18GB two-bay Fast/Wide array
Truevision Targa 2000 RTX
CTX 17-inch VGA monitor
Sharp 15-inch NTSC monitor
Sony VX-1000 DV Camcorder
Panasonic AG 1970 S-VHS deck

Windows NT 4.0
Adobe Premiere 4.2
Adobe Photoshop 3.0
Avid MCXpress (with real-time effects) 1.5
Ultimatte Ultimatte
VCE Pyromania
MetaTools' Kai's Power Tools III
MetaTools' Final Effects
Kinetix 3D Studio Max
Microsoft Word
Microsoft Excel

Operation Space Chase

Fire up your hardware—it's time to change the universe as we know it. We'll be using Premiere, Photoshop, *and some predigitized AVIs to re-create the special effects we used in our final space-chase edit. To produce the scene in full, we shot plastic models and actors against blue screens, edited the blue-screen files, and then slapped in some trippy backgrounds and special effects. For your part, you'll be taking AVIs in various stages of editing, applying the special effects in* Photoshop, *and then syncing everything together in* Premiere. *Before proceeding, consult the Elements box on the next page and view the corresponding files on the* bootDisc. *When you're familiar with all the source files (and how they appear in the final edit), jump right to Step 1.*

In Steps 1 through 5 you'll use Premiere *to turn an AVI file into a filmstrip, then work on it in* Photoshop.

1 *Launch* Premiere.

2 *Open the file named msfront.avi in the THRILL folder in the* bootDisc.

3 *When you place your mouse pointer over the Clip window it turns into a hand. Left-click on the Clip window and drag the clip to the construction timeline's Track A, and let go of the mouse (Figure 1). Notice that as the spaceship flies into the shot, you can see its stand—we're going to get rid of it. First, we have to convert that AVI format into a filmstrip, so drag the yellow bar at the top of the Construction window and stretch it until it covers the length of the clip.*

4 *Go to the menu bar, click on Make, select Make Movie, and then click on Output Options (Figure 2). In the Options box, set screen resolution to 320x240, type to Full-Size Frame, output to Filmstrip, and click OK.*

5 *Now click on the Compression Settings box (Figure 3). If you have a capture board in your system, you'll want to use the algorithm that came with the board. If you don't have a capture board click on Intel Indeo Video R3.2, leave the depth at Millions, move the quality slider to 100%, and, under Options, set the frame rate to 25fps. Leave everything else on default settings and click OK. Name this clip "msfilm," and click OK. When the file has been converted, play it to see how it looks, then close* Premiere.

Now it's time to edit blue screens and add effects in Photoshop.

6 *Launch* Photoshop, *and open your msfilm Filmstrip file. You'll see that each of the clip's frames appear on top of one another. Use* Photoshop's *magnifying glass to enlarge the first frame, then scroll down to the point at which you start to see the spaceship's base in the picture (Figure 4).*

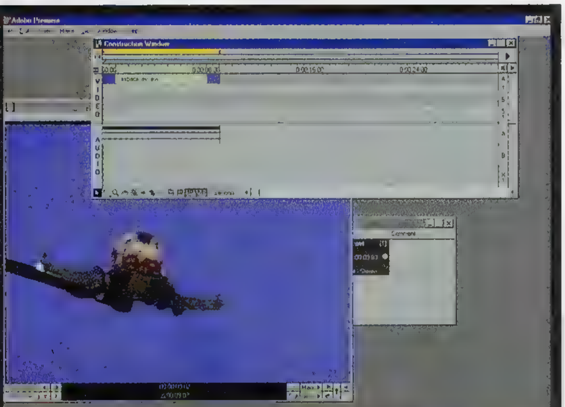
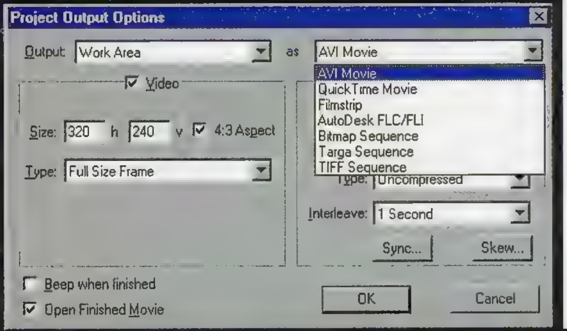


Fig 1



Project Output Options

Output: Work Area as AVI Movie

☑ Video

Size: 320 h 240 v ☑ 4:3 Aspect

Type: Full Size Frame

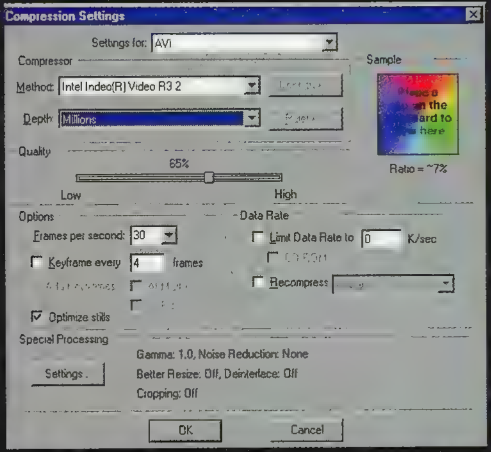
Type: Uncompressed

Interleave: 1 Second

☐ Beep when finished

☑ Open Finished Movie

Fig 2



Compression Settings

Settings for: AVI

Compressor

Method: Intel Indeo(R) Video R3 2

Depth: Millions

Quality 65%

Options

Frames per second: 30

☐ Keyframe every 4 frames

☑ Optimize stills

Data Rate

☐ Limit Data Rate to 0 K/sec

☐ Recompress

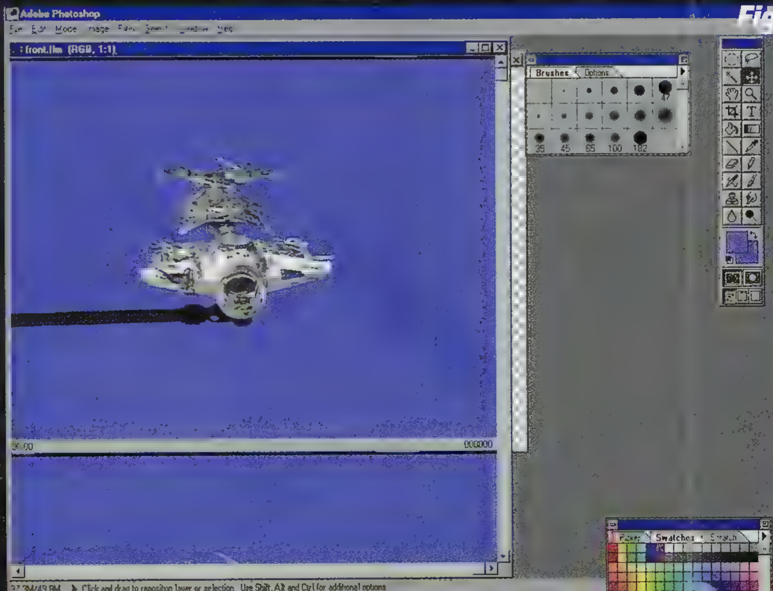
Special Processing

Gamma: 1.0, Noise Reduction: None

Better Resize: Off, Deinterlace: Off

Cropping: Off

Fig 3



Click and drag to reposition layer or selection. Use Shift, Alt and Ctrl for additional options

Fig 4

Steady Now, Steady!
How to shoot for capture

DV can be a sensitive beast, so keep these tips in mind when shooting your source material.

- Too much activity in the background can be hard on your capture board. Trees swaying in the wind, wild wallpaper designs, and venetian blinds can cause problems. Try to film against solid backgrounds (and use a tripod for steadiness).
- Use good lighting. A poorly lit clip translates into a poorly digitized clip, which means graininess and bad colors.
- Don't use your camera's mic, which probably sucks. Get a decent mic with a long cord that will plug into your camera's mic jack. Taping the microphone to the end of a broomstick makes an excellent boom.
- Use the highest quality tape stock, and high-performance gold series cables for the best conductivity. Try not to digitize from a second-generation tape; picture noise will be unacceptable.
- If possible, use the camera you shot with as your playback device. The heads that recorded your images will play video back more accurately than another manufacturer's VTR.
- The most important rule about shooting against a blue screen is that the blue screen be evenly lit. You don't want any wrinkles, hot spots, or shadows because they'll interfere with the composite process.
- You can make a blue screen relatively cheaply. A can of chroma blue from a camera supply store retails for around $20 and you can buy a fairly large canvas from any art store for around $35.

Elements

Here's a list of all the files we used for this project.

AVIs in order of appearance:

[illegible] *large ship approaching*
ssback1.avi *small ship escaping*
[illegible] *first pilot calling for help*
[illegible] *second pilot telling first pilot to pull out*
[illegible] *large ship shooting*
[illegible] *first pilot screaming*
[illegible] *small ship about to be destroyed*
[illegible] *explosion (comprised of all the TGA files in the* bootDisc *Frames folder)*
[illegible] *the completed project*

Backgrounds in order of appearance:

[illegible] *for msfront1.avi*
[illegible] *for ssback1.avi*
[illegible] *for rick.avi*
[illegible] *for ken.avi*
[illegible] *for msfront2.avi*
[illegible] *for rick2.avi*
[illegible] *for ssback2.avi*

Music/sound effects:

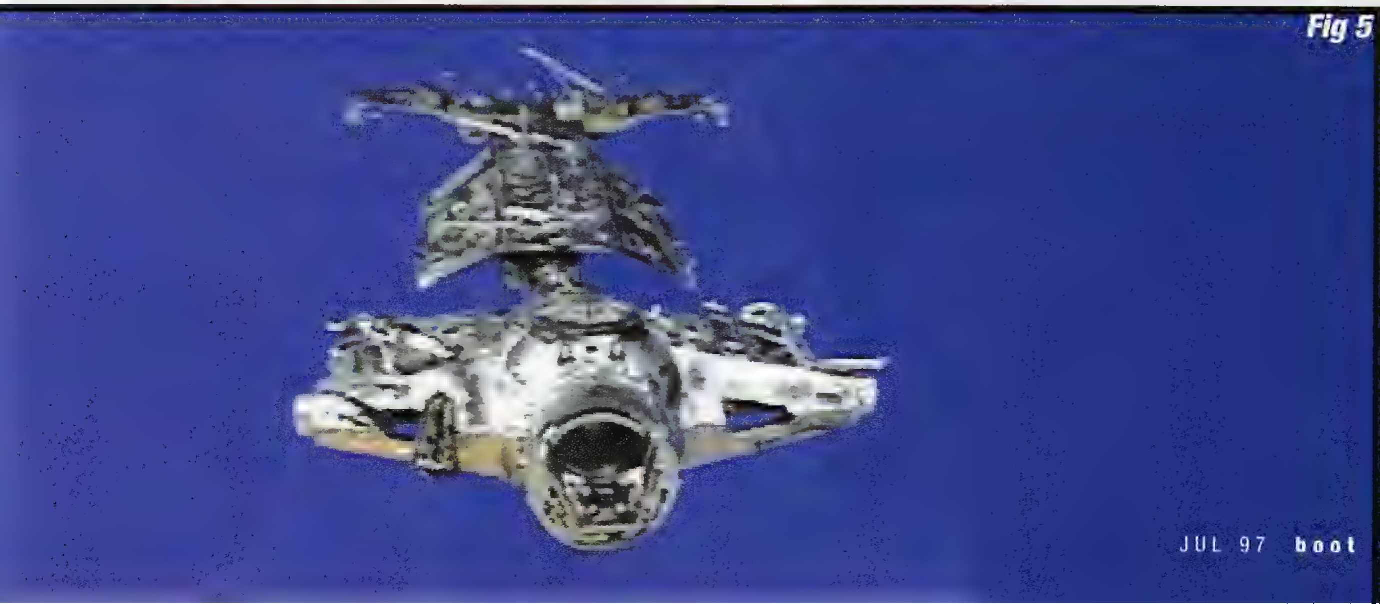
[illegible]
[illegible]
[illegible]

TRY IT ON THE DISC

7 ***Using the color picker (the eye-dropper icon), click on the blue background to sample the blue color, then double-click on the paintbrush icon. This brings up your Brush Settings options. Under Options, drag the Opacity slider to 100%, and, under the Brushes tab, choose a brush size that you find comfortable. You're now ready to paint the model's base out of the picture (Figure 5). Zoom in with the magnifying glass and if the blue doesn't look like it matches, use the eye dropper on another part of the blue background to get a better color sample. When you've painted all the frames—a very time-consuming process—save your work and exit*** **Photoshop*****. If you want to check your work, open*** **Premiere*****, open*** **msfilm*****, and play it from the Clip window.***

Congratulations, you've just completed your first effect—albeit a minor one. Rather than have you repeat the process with all the other spaceship clips, we've done the work for you—the prepainted clips are called **msfront1.avi, ssback1.avi, msfront2.avi*****, and*** **ssback2.avi** ***on the*** **bootDisc*****. When building your own original material, use*** **Photoshop** ***to paint in laser blasts, smoke, and lens flares.***

Fig 5



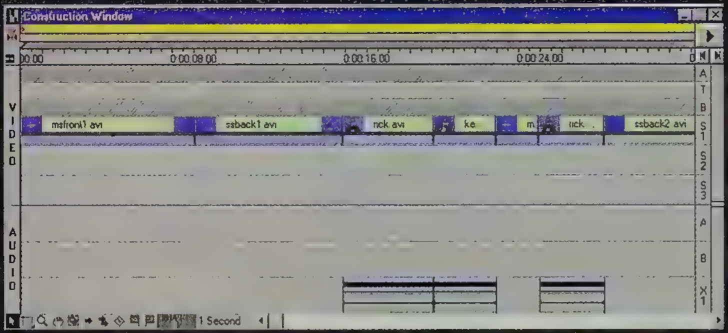

Construction Window
0:00:00
0:00:08:00
0:00:16:00
0:00:24:00
VIDEO
AUDIO
msfront1 avi
ssback1 avi
rick avi
ke
m
rick
ssback2 avi
1 Second

Fig 6

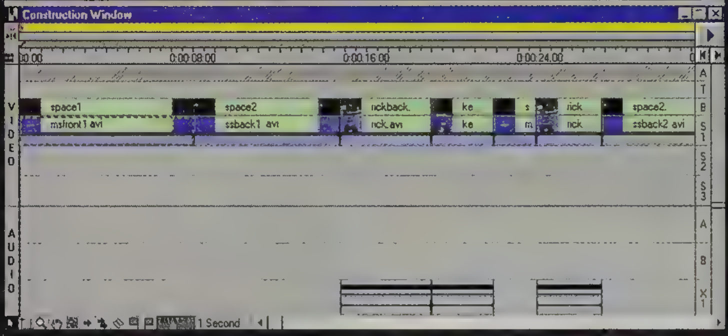

Construction Window
0:00:00
0:00:08:00
0:00:16:00
0:00:24:00
VIDEO
AUDIO
space1
msfront1 avi
space2
ssback1 avi
rickback
rick avi
ke
ke
rick
rick
space2
ssback2 avi
1 Second

Fig 7

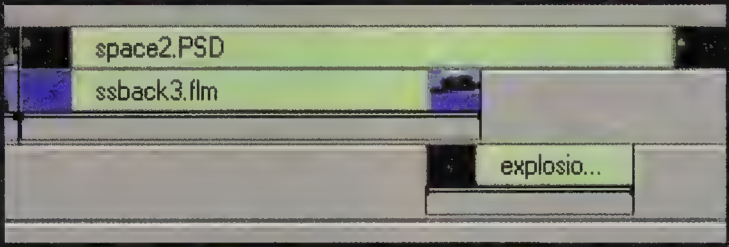
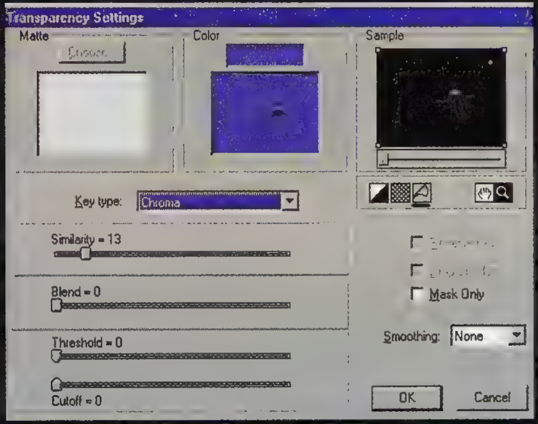

space2.PSD
ssback3.flm
explosio...

Fig 8


Transparency Settings

Key type: Chroma

Similarity = 13

Blend = 0

Threshold = 0

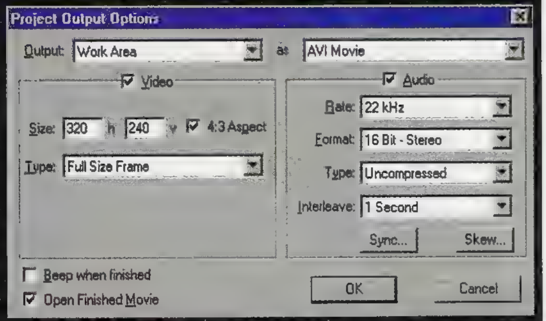
Cutoff = 0

☐ Mask Only

Smoothing: None

Matte
Choose...
Color
Sample
OK
Cancel

Fig 9


Project Output Options

Output: Work Area as AVI Movie

☑ Video

Size: 320 h 240 v ☑ 4:3 Aspect

Type: Full Size Frame

☑ Audio

Rate: 22 kHz

Format: 16 Bit - Stereo

Type: Uncompressed

Interleave: 1 Second

☐ Beep when finished

☑ Open Finished Movie

Sync...
Skew...
OK
Cancel

Fig 10

TRY IT ON THE DISC

Premiere and Photoshop on the bootDisc

Now let's prep for the explosion and get our background files ready.

8 *Launch* Premiere *and start a new project. Select Open, then scroll to your CD-ROM icon, and double-click on the explosion folder. You should see a series of TGA files, each representing a single frame of the explosion.*

We need to bring each one into Premiere's construction window and stack them linearly on the timeline, so go to the File menu, choose Preferences, and select Still Image. This brings up a Settings box that lets you change the length of each still image you bring into the program. Set the number of frames to 1 and click OK.

Now you can open each explosion frame and drag it onto the timeline. (If, when dragging the frame to the timeline, all you see is a sliver, drag the small, teal-colored marker at the bottom of the window to the left. This will enlarge the working area of the timeline.) After you've stacked each of the frames in succession, render the series as a Filmstrip (see Steps 4 and 5), and save it as explode.avi. (If you get the idea and don't feel the need to open every explosion frame, open explode.avi on the bootDisc*. It's the finished movie where we've done the work for you!)*

9 *Each composite shot needs a background, or your subjects will appear to float in a black void. You can create your own backgrounds in* Photoshop*, or use the ones we've provided for you called space1.jpg, space2.jpg, rickback.jpg, and kenback.jpg. To create your own in* Photoshop*, select New under the File menu, set your frame size to 320x240, and paint away.*

Now that all the stands are painted out of the spaceship shots and we have our backgrounds and explosion, we're ready to arrange everything in the timeline and begin compositing.

10 *Open* Premiere *and start a new Project file. (If you don't see a construction timeline when the application launches, click on Windows on the menu bar, and choose Construction.) First, call up all the elements and drop them into the construction timeline. Place the shots in the following order on the S1 track: msfront1.avi, ssback1.avi, rick.avi, ken.avi, msfront2.avi, rick2.avi, and ssback2.avi. The clips should snap into place as they get close to each other (Figure 6).*

Tips for Model Making

You can buy a premade spaceship from Toys 'R' Us and film it, but because, more than likely, that spaceship is copyrighted, you can't turn around and sell the footage commercially. On the other hand, you can buy a spaceship model and assemble the pieces to create something new. Those of you with a keen eye may recognize the mother ship in the msfront shot. It was made with TIE Fighter and X-Wing model parts.

11 *Open each background file and place them on Track B above their filmed counterparts. The sequence should be: space1.jpg, space2.jpg, rickback.jpg, kenback.jpg, space1.jpg, rickback.jpg, and space2.jpg (Figure 7). When you drag and drop the still images to the Construction window, click on each image (a horizontal arrow appears) and stretch it to the length of its corresponding clip. If you can't see the frame you dropped onto the timeline, slide the teal marker at the bottom of the Construction window to the left until you do.*

12 *Before inserting the explosion, we need to add one more track to our timeline. To do this, click on Project, go to Add/Delete Tracks, set the number of audio and video tracks to 3, and click OK. When you open your explosion filmstrip, drag the clip to Track S2 so it overlaps ssback2.avi—the last clip in the chain—by a few frames (Figure 8). Everything should be in place to begin compositing.*

13 *Now we're going to remove the backgrounds from all the clips on tracks S1 and S2. Begin with the last spaceship (ssback2.avi) in the clip. Click on ssback2.avi to highlight the clip. Go to Clip under Premiere's main menu bar and scroll down to Transparency (Figure 9). From the Transparency Settings window you should see the spaceship in the Sample window. For Key Type select Chroma, which will activate the Color preview window. When your cursor passes over the Color preview, the arrow icon changes to an eyedropper. Select a section of the blue background. As you experiment with the eyedropper, various segments of the space-background file will appear behind the spaceship. Using the Similarity and Blend sliders, you can key out the rest of the background. The slider bar beneath the Sample window gives you a quick preview of your work.*

14 *Repeat Step 13 for all the clips on the S1 track.*

15 *For the explosion, you still want to use the transparency setting, but instead of choosing the Chroma key, select RGB Difference. Use the eyedropper and select the black background in the Color window. When you do this, the spaceship and the star background will appear in the Sample window to the right. To check your work, drag the Sample window slider to the right. To include the explosion sound effect, open the explode.wav file, drop it onto audio Track X1, and line it up with the explosion clip. Follow suit with lasers.wav and sndtrk.wav.*

16 *You're now ready to render the project as an AVI movie. To do this, follow Steps 3, 4, and 5, but instead of rendering your movie as a filmstrip, set the file type to AVI (Figure 10). Name the movie and click Save. That's all there is to it! Rock on, Luke, and may the force be with you.*

Video Abduction

Universal truths about DV digitization

The instruction manual that comes with your capture board should describe how to digitize with your specific hardware, but there are a few tips and tricks that will help you achieve killer results no matter which hardware you're using. Always remember: No software on the market can save a poorly digitized clip.

- Use an A/V drive. When you buy your A/V drive, make sure the platters are spinning at least 7,200rpm. Also check that the drive has been optimized for video capture, not for data or video-on-demand.
- Defrag your hard disk frequently. When your video's flying in at higher than 3MB/sec you don't want anything standing in its way. If there are chunks of data sitting in the middle of the platter, the heads need to work harder to get around them. Depending on the chunk size, it could cause your video to drop frames during capture.
- Error-check your disk—it never hurts to correct bad sectors and lost file clusters.
- Pre-allocate space before capture. It helps to section off an area of your hard disk that will be dedicated to your video stream.
- Close all unnecessary applications—you will need every resource imaginable. If you're attached to a network, disconnect. Turn off all screen savers and background utilities.
- Don't capture more than necessary. Unless you're a total audiophile, capturing your audio at 22kHz should work just fine—setting your parameters to 44kHz is a waste of space.
- Use the capture utility that comes with the board. It's true that you can capture from within many editing applications, but you'll probably get far better performance when you use the utility supplied by the board manufacturer. In many cases it will be *VidCap 32*.
- After you buy your capture board, go to the vendor's web site and make sure you have the latest drivers—you never know how long your board might have been sitting in some warehouse while newer, better drivers were being released.

Rick Popko is the news editor for D/V Magazine. *Special thanks to VCE for letting us put one of their explosions in our tutorial, and to Ken Dashner and Dan West for building the models.*

Flash-forward to 1998

You remove the new incendiary device from its protective packaging and gingerly slide it into a vacant PCI slot. It doesn't explode on contact, so, like the point man of a bomb squad, you breathe a sigh of relief. You've heard rumor of the device's firepower, and can only guess at the extreme technology packed inside.

You boot your computer and run the experimental demo. A warning erupts from your speakers: "Step away from the computer. Step away from the computer. This is not a drill." You shufflestep five paces and push down your visor. Your system begins to throb. Your monitor begins to crackle. The street lamps dim in five Midwestern states. And the light show begins.

Straight from the lab: The ATI Xpert@Play features 100MHz SGRAM and an AGP bus connector, features that will soon be common on the hottest 3D cards.

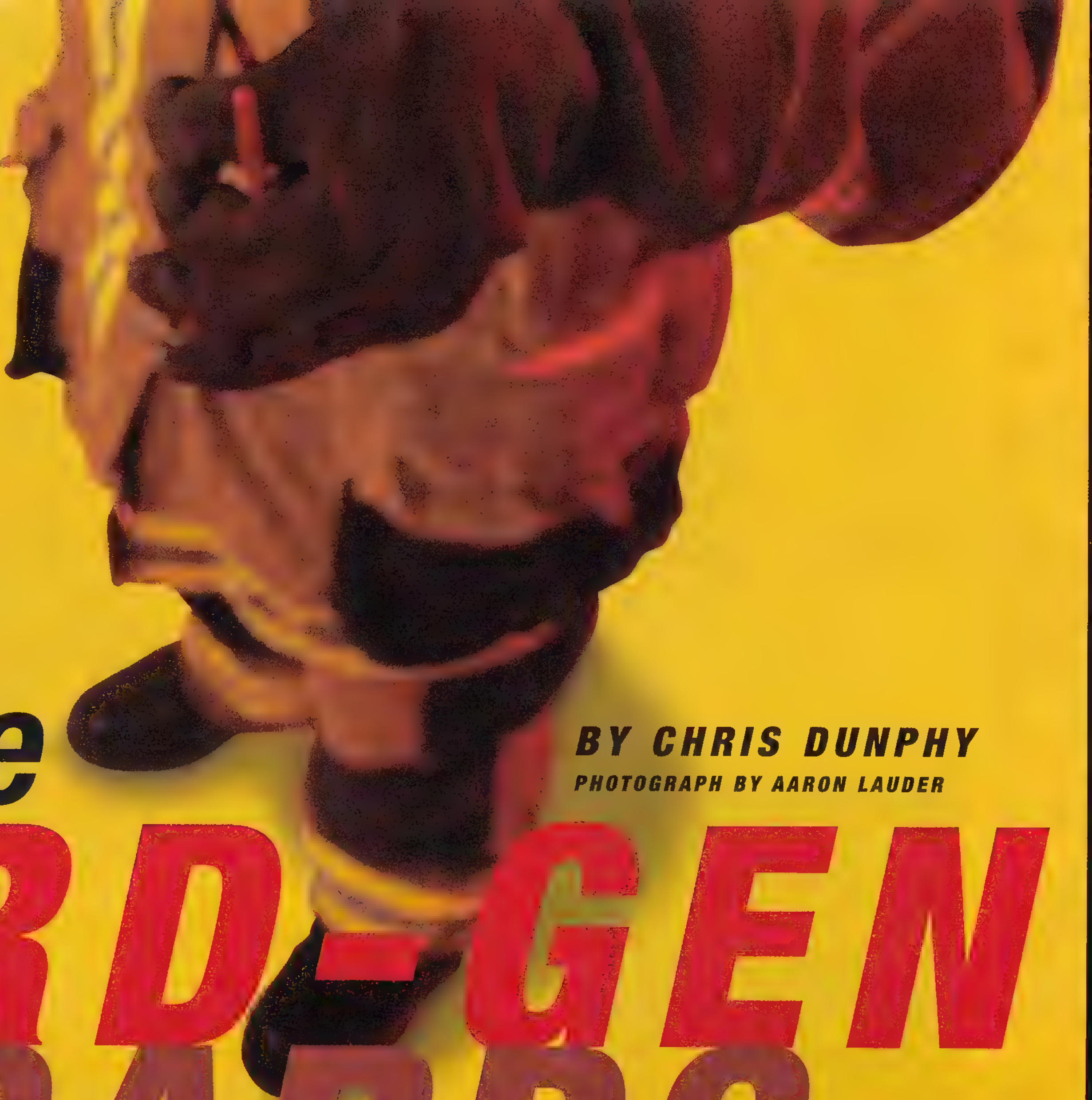
Ahhh, the power of 3D acceleration... Seems like only yesterday we were blown away by the crude geometries of *Doom* in a meager 256 colors. Now we vibe on *GLQuake* in all its bilinear-filtered, 30fps glory and look back at *Doom* like it was just a bunch of stick figures on a cave wall in Lascaux.

The race for 3D supremacy is speeding along at a breakneck frame rate, and the quest for better visuals and faster speeds is creating chips and software titles that threaten to mothball the arcades. The race is also leaving some big winners—and losers—in its wake. 3Dfx is preparing to go public with a stock offering, a telling illustration of its early success with the Voodoo chipset. Cirrus Logic, meanwhile, is struggling to stay afloat as it tries to shapeshift from a 2D to a 3D world. There have been some outright casualties, too: Rockwell's Brooktree division canceled its 3D-chip project entirely.

Voodoo now reigns supreme, and the third round of the 3D fight is upon us. All bets are off as the industry plunges headlong into the future and as the upstarts attempt to pry 3Dfx from its comfortable throne (in marquee value, if not in actual sales). The only certain winner is the unabashed, "I-want-it-all-and-I-want-it-now" 3D fanatic. The third generation of 3D accelerators promises cheaper, faster, better-looking technology. In fact, if the current development pace continues, the day of *Toy Story* generated on desktops in real time may be closer than you think.

Our exclusive first-look at the 3D pipeline—the gear that will be delighting your eyes later this year and in early 1998—leads you chip-by-chip through the development labs, giving you an up-close look at new, exotic memory-access architectures and software titles that only run on 3D-accelerated systems.

You may now remove your visor.



Explosive THIRD-GEN 3D CARDS

BY CHRIS DUNPHY

PHOTOGRAPH BY AARON LAUDER

THIRD-GEN 3D VIDEOCA

Making the transition from arcade to your PC, *Mace* will only run on 3Dfx-accelerated systems.

3Dfx:
Reigning Champion

The "quiet period" imposed by the Securities Exchange Commission prior to a public stock offering prevented 3Dfx from talking to us about its development strategy. But word on the street is that a 3D-only chipset called the Voodoo2 will quadruple Voodoo performance this fall—this to tide us over until Banshee, a higher-performance 2D/3D combo, hits. Vice president of marketing Andy Keane expressed frustration at being unable to give further details, responding repeatedly with, "Are there any more questions I *can't* answer for you?"

What 3Dfx *could* show us was content. By being the first to take 3D to the next level, the San Jose-based company has had game developers banging down its door to do special 3Dfx versions of their games, often just to prove how far a title could be pushed. At the April Computer Game Developers Conference, nearly every booth pimping a 3D software title was doing so on Voodoo-powered hardware. The most impressive titles included an arcade-perfect conversion of *Mace*, a sneak peak at *Prey*, and 3D-only works in progress from Mango Grits and GameFX. 3Dfx was also showing off what multiple Voodoo chipsets could do when working in parallel—such as playing *GLQuake* at an ungodly 70fps or serving as the heart of the hot SF Rush arcade console.

3DFX GAME PLAN

chips *Voodoo and Voodoo Rush (current); Voodoo2 and Banshee (unconfirmed)*
available *Voodoo2, Q3 97; Banshee, Q1 98*
theoretical fill rate **45Mpixels/sec (Voodoo and Voodoo Rush)*
show-off titles *GLQuake*
URL *www.3dfx.com*

Rendition:
RISCy Business

Rendition made a sizable splash last fall with its Vérité V1000 chip and the first 3D-accelerated port of *Quake*. But then *GLQuake* on the 3Dfx came along to steal the hearts of hardcore 3D junkies, and Direct3D support for Rendition's DMA memory model was late to materialize (coming at last in DirectX 5.0 late this summer), robbing the Vérité of the Windows 3D performance it should have had. But Rendition is back with a second-generation chip called the Vérité V2200 that will have people playing close attention again.

The Vérité is the one 3D chip that can gain features with time. At its heart is a programmable RISC graphics processor that, among other things, offloads the triangle setup pipeline from the CPU. The new V2200 speeds this RISC core, adding a hard-coded triangle engine to perform the final steps in the setup chain. Also new is support for up to 16MB of SGRAM clocked at up to 100MHz, and a 1x AGP port for faster access to system memory. The enhanced horsepower spills over into the 2D side of things as well, giving the V2200 twice the Windows performance of its predecessor. The V1000's Achilles' heel of poor VGA (not SVGA) speed is being addressed, too, upped x3.

The V2200 uses its RISC engine to do full DVD motion compensation for video, and provides a digital video-output port to allow for five-tap flicker-filtered TV-out when coupled with a digital encoder chip. One of the Vérité's unique features is its support for stereoscopic glasses without the need for additional external hardware. During a visit to Rendition HQ we were knocked on our asses when we saw stereo *Quake* and stereo *MDK*. Hopefully Microsoft will make good on its promise for stereo support in a future DirectX. Being the only chip out this fall that's ready to take advantage of stereo titles (without the need for extra hardware), the V2200 should be a major win for Rendition.

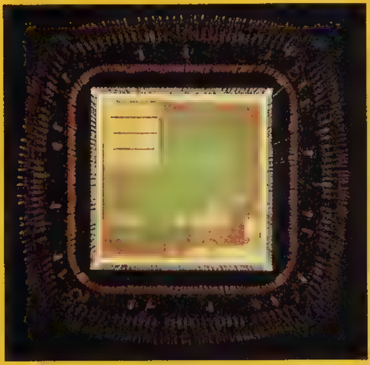
RENDITION GAME PLAN

chips *Vérité 2200*
available *Q3 97*
theoretical fill rate *50Mpixels/sec*
show-off titles *Quake and MDK—in stereo 3D!*
URL *www.rendition.com*

nVidia:
Phoenix Rising

NVidia's NV1 chip was one of the first consumer-grade 3D accelerators, coming out more than a year ago in the Diamond Edge 3D. It flopped big time. Not to be discouraged, nVidia spent the past year learning from its mistakes, and is back with a very hot 2D/3D chip called the Riva 128.

Featuring a 128-bit wide path to 100MHz SGRAM, the Riva 128 has an enormous amount of memory bandwidth and can deliver a 100 million filtered pixels per second fill rate. The blazing polygon speed will leave you breathless as well: Thanks to a full triangle setup engine coded in very fast hardware, up to 1.5 million triangles per second can be drawn. All special effects and texture filters are done in one pass to minimize slowdown when turning on effects, and although trilinear filtering isn't supported, the chip uses special techniques to enhance bilinear filtering to give it a near-trilinear quality.



The Riva 128 features a 12K on-chip texture cache to speed up rendering.

The Riva 128 takes advantage of main memory for textures over a full AGP 1x interface, which is a good thing because the card only supports 4MB of graphics memory locally. An onboard 12K cache helps smooth over any AGP latency issues.

An integrated 206MHz RAMDAC provides good high-resolution support, and an on-chip flicker filter provides high-quality TV-out when coupled with an external encoder. A digital video-input port works with a filtered video scaler that also does edge enhancement to provide sharp on-screen movie watching.

NVIDIA GAME PLAN

chips *Riva 128*
available *late Q2 97, shipping in STB Velocity 128 3D*
theoretical fill rate *100Mpixels/sec*
show-off titles *G-Police*
URL *www.nvidia.com*

Microsoft's *3D Baseball* will require a 3D accelerator, and looks great on Rendition's new chip.

RENDITION
V2200-B MS
9644-SH7843A1
JAPAN

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*The fill rate indicates how fast a graphics chip can color polygons on screen and is measured in millions of bilinear filter pixels per second. The fill rates given in this article are from the chip makers themselves and should be taken as such. But these rates do give you an idea of what chipmakers aim to deliver.

ATI:
Extreme Rage

ATI has been re-engineering its chips at a rapid rate, adding significant new features and performance improvements to the 3D Rage with each go around. The company's newest chip, the ATI 3D Rage Pro, makes a huge jump in 3D performance over earlier efforts, and is the first chip to fully implement Intel's 2x 133MHz AGP spec with sideband signaling and all other optional features enabled.

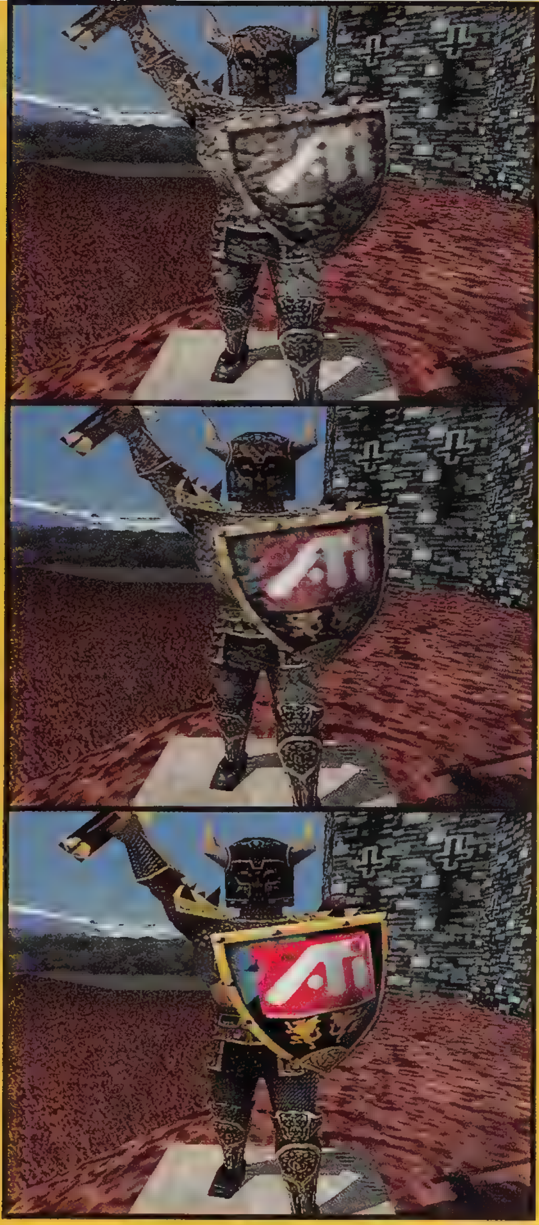
With up to 8MB of 100MHz SGRAM and a full on-chip floating-point triangle setup engine, the Rage Pro can pump pixels fast—even doing trilinear filtering in just one pass through the pipeline. Besides implementing all Direct3D-supported 3D features and effects, the Rage Pro adds some new ones such as specular highlighting, compressed textures, and texture morphing. The 4K of on-chip texture cache speeds things up even further and helps compensate for the latency of AGP.

ATI looks like it has every intention of maintaining its lead as the king of computer video. A 4x2 DVD resolution video scaler gives superb on-screen video quality, and DVD motion-compensation circuitry allows MPEG-2 to be decoded at a full 30fps in software on a Pentium-II class machine.

The best thing about the Rage Pro is that it isn't just a chip waiting to be finished and sold to card makers. Since ATI makes its own graphics boards, there should be Pro-powered ATI Xpert@Play and Xpert@Work boards on the shelves soon after you read this (guess which one is being targeted at consumers). For high-end work, the Pro can also be paired with up to 16MB of dual-ported WRAM memory and an external RAMDAC for doing true-color work at 1600x1200 and beyond.

ATI GAME PLAN

chips *3D Rage Pro*
available *June 97 in ATI Xpert@Play for $299*
theoretical fill rate *45Mpixels/sec*
URL *www.atitech.com*



This sequence shows off the Rage Pro's texture-morphing features. Dig the shield!

Matrox:
No Filter For You!

The cult of Matrox preaches the mantra incessantly: "Filtering isn't necessary, frame rate is everything." But texture filtering, true alpha-blending, and fog effects are the elements that make 3D-accelerated games look infinitely better than their plain-vanilla counterparts. By ignoring these effects, a game pumped through Matrox's Mystique looks sad when compared with just about anything on a 3Dfx card, or any other next-gen chip described in this article.

Matrox's answer to the critics? The new Mystique 220, which adds—hold on tight—fog. The 220 also comes with a faster 220MHz integrated RAMDAC for support of higher resolutions, and can be upgraded to 8MB of SGRAM memory. Starting at $149 for a 2MB board, the Mystique 220 will likely remain one of the best 2D cards you can buy. The most interesting thing on Matrox's road map is the Rainbow Runner multimedia board, which takes the place of RAM expansion on any Mystique. It gives you high-quality TV-out, and very high-quality video capture thanks to a motion-JPEG chip doing real-time compression. The Rainbow Runner adds $249 to the cost of the Mystique plus $79 if you want a TV-tuner.

MATROX GAME PLAN

chips *Matrox MGA-1164SG*
available *June 97 on the Mystique 220*
theoretical fill rate *25Mpixels/sec (point sampled)*
show-off titles *Time Warriors (but only show it to friends who've never seen a real 3D accelerator)*
URL *www.matrox.com*

Cleaning Up Loose Polygons...

A quick glimpse at some other projects simmering in labs around the world.

NEC/VideoLogic *PowerVR has proven to be amazing at running native titles, but Direct3D performance has lagged. A 2D/3D variant of the PowerVR, the PMX1, aims to quadruple its already considerable 3D performance, in addition to providing a slew of 2D and video-acceleration features. This chip should be really hot this fall—doubly so if the Direct3D and OpenGL drivers at last allow this architecture to shine.* ***www.powervr.com***

Cirrus Logic *Cirrus' first 3D chip, the Laguna 3D, was late to market, and should have stayed that way. Its poor performance and visual quality make ViRGE look good. Cirrus has fixed some of the Laguna's flaws in an AGP-enabled follow-up chip called the Laguna 3D-A, but it remains to be seen how many card makers will jump for it. Later this year, Cirrus will present the Laguna 3D-AT, which adds a triangle setup engine.* ***www.cirrus.com***

Tseng Labs *We've been eagerly awaiting Tseng's 3D ET6300 announced last fall for an early '97 delivery. Featuring a 128-bit path to 100MHz MDRAM memory, a 220MHz RAMDAC, and an on-chip floating point triangle setup engine, the ET6300 should have plenty of horsepower, though it will lack the ability to do trilinear filtering in a single pass.* ***www.tseng.com***

Alliance Semiconductor *Alliance is working on what may be the first 3D accelerator to feature integrated DRAM. With 2MB on chip for a frame buffer, up to 4MB external, and AGP for access to main memory, the Alliance ProMotion-ED4D may become an excellent inexpensive choice, and a good foundation for Alliance to build upon.* ***www.alsc.com***

3Dlabs *New to 3Dlabs high-end arsenal is the Glint Gamma geometry processor, which implements the entire OpenGL 1.1 geometry pipeline (including lighting and geometry!) in hardware, pumping 3.3 million polygons per second to be rendered by the Glint MX rendering chip. 3Dlabs also has a new incarnation of the Permedia line. It can render 80Mpixels/sec, features an AGP 1x interface, and an integrated floating-point setup engine.* ***www.3dlabs.com***

Chromatic Research *The upcoming Mpact 2 chip is more than just a 3D controller. It wants to be your sound card, modem, DVD decoder, and videophone, too. The Mpact 2 provides a full 3D pipeline and a rasterizer implemented in hardware, but is also a highly optimized media processor that can crank along at 6 billion operations per second with upgradable medi-aware modules. The 1.3GB/sec bandwidth is provided by two RAMbus channels.* ***www.mpact.com***

Even with bump and reflection mapping turned on (notice the eagle's base and the floors), Tritech's Pyramid3D can render this scene at 50fps at 640x480. Whoah!

TriTech:
Optical Freak Out

In a previous 3D-technology preview (*boot* 02), we took a chance and featured a screenshot illustrating the power of TriTech's Pyramid3D—even though the chip was still a year from completion and as vaporous as menthol rub on a fat man's belly. The sheer beauty of the frame suggested that the scene could only be rendered in fits and starts, but TriTech insisted it could be done in real time.

We're still waiting for proof. And we're still excited about Pyramid3D's potential.

TriTech's Winston Chen says, "Our architecture is a single-chip optical physics-based architecture; very different from anything else on the market." He goes on to say that the Pyramid3D is the only inexpensive 2D/3D accelerator (expect a 4MB board to cost about $200) that can do Phong shading, specular highlighting, bump mapping, radiosity texturing, and nonlinear fogging—all in hardware. To further enhance visual quality, perspective correction is applied not just to the textures, but to the lighting and fog effects as well, so that there are no disconcerting mismatches. The Pyramid3D can combine any number of textures in one pass, and fully supports trilinear filtering.

The key to the Pyramid's flexibility is a programmable pixel and geometry processor within the chip that can execute complex shading algorithms and perform full triangle setup onboard. The memory interface is via 100MHz SGRAM, and a 200MHz RAMDAC is included internally.

The Pyramid3D is been designed with AGP in mind, and by the 1997 holiday season a new version of the chip, which adds a 1x implementation, will be available. Dual CRT support and TV-out features will be added in early 1998. The Pyramid3D engine is also scalable across multiple chips, so a board could be built using two chips. For really fast rendering, up to 10 chips can work together.

If the Pyramid3D that hits production lives up to its screenshots, the standard for 3D visual quality is about to make another huge leap. Unfortunately, since Direct3D does not yet support many of the Pyramid's advanced features, TriTech may face a

TRITECH GAME PLAN

chips *Pyramid3D*
available *Q3 97*
theoretical fill rate *50Mpixels/sec*
URL *www.tritech-sg.com*

Intel:
The Battleship Slowly Turns

Intel is hard at work on a graphics chip code-named Auburn (to be launched later this year as the Intel 740), which it hopes will set a new standard for baseline 3D capability. Referring to the 3Dfx, Intel's Brian Ekiss says, "We'd like to bring this level of performance to more consumers. With the Intel 740, we're aiming to be performance-mainstream."

The I740 is a 2D/3D/video part that will be AGP-only, and will thus only work on Pentium II-based systems. Intel will probably sell motherboards with the I740 built onboard, but will also sell the chip to board makers constructing add-on cards. The 3D capabilities of the chip are based in part on Lockheed Martin's high-end Real3D chipset, a variant of which is used in Sega's Model 3 board inside *Virtua Fighter 3*. If Intel has managed to scale this expensive hardware down into a single chip, the I740 (and its descendants) could prove very formidable.

Upstarts who scoff that Intel doesn't know how to build a graphics chip: Beware. When Intel started making motherboard chipsets, it didn't just move in to compete; it went all-out to take over the market, and did so in short order. There is every reason to believe that Intel may try this strategy again for graphics controllers, using its massive resources and chip production capacity to steamroll the market.

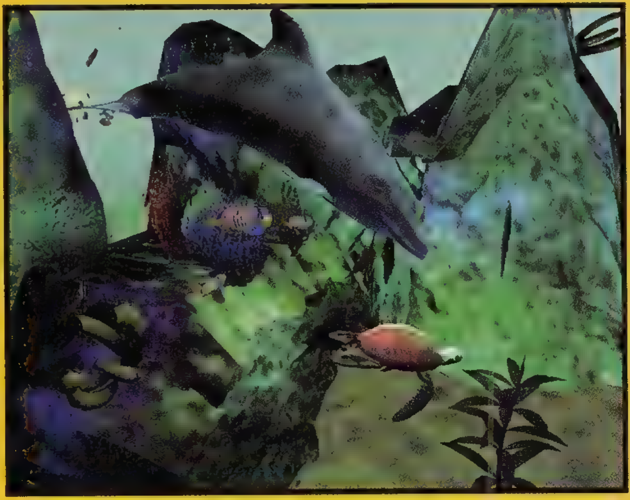
Dig the implications: Intel builds the majority of the motherboards used in today's systems. How many system builders would want to buy a second graphics card when a fairly high-powered Intel 3D chipset comes on the motherboard? This may not happen this year or next, but all the small fry are somewhat concerned. Even further down the road, Intel could move its graphics capabilities off the motherboard and into the Slot 1 cartridge, or even into the CPU (like the Cyrix GX did). Even the most innovative of competing designs will be hard-pressed to compete with that kind of access to memory and cache.

Only one compelling argument says that Intel shouldn't get into graphics controllers: the cost of fabrication. As Rendition's Jay Eisenlohr put it, "Why would Intel waste their fabrication capacity building graphics chips that sell for under $30 when they could be using the same plant to build Pentiums that sell for 10 times that?"

INTEL GAME PLAN

chips *Intel 740*
available *Q3 97*
theoretical fill rate *TBA*
URL *www.intel.com*

Intel has motherboard aspirations with its I740 chipset. The company would not divulge the speed at which this scene could be rendered.



RSSI:
Fill Rate Extreme

RSSI has kept a low profile in the 3D wars, last year releasing the amazingly inexpensive yet underwhelming PIX chip under the S-MOS banner. But now the RSSI designers have split from their S-MOS parent, forming a new independent company. We're in for a treat this summer, and an even bigger surprise late this fall.

The first thing coming is the PIX3000 2D/3D/video chip that provides fast 3D acceleration with on-chip polygon setup, independent integrated monitor and TV-out, bilinear filtering (unlike the original PIX), and DVD motion compensation. The 200MHz integrated RAMDAC allows for true-color at 1280x1024, and the 128-bit SGRAM interface lets you connect up to 8MB.

As if that weren't enough, the big treat coming later this year is a chip code-named Tex that is spec'd to render pixels faster than anything else on the horizon. The Tex is a 3D-only chip that can draw more than 250 million trilinear filtered pixels per second, allowing complex 1024x768 scenes to easily play at 30+ fps. Impossible? No—inevitable.

To ease the necessary integration with a 2D chip, Tex has an integrated PCI bridge so that a 2D chip can share a card with no need for extra electronics. Like the PowerVR, the Tex and PIX don't need a Z-buffer, but unlike the PowerVR, the RSSI architecture does work with traditional polygons rather than planes. The polygons are sorted front-to-back in hardware and rendered per scan line. In the case of the Tex, scenes are rendered into a temporary line buffer at double (or more) the desired resolution, then smoothly scaled down. This gives the apparent anti-aliased quality of a 2048x2048 screen.

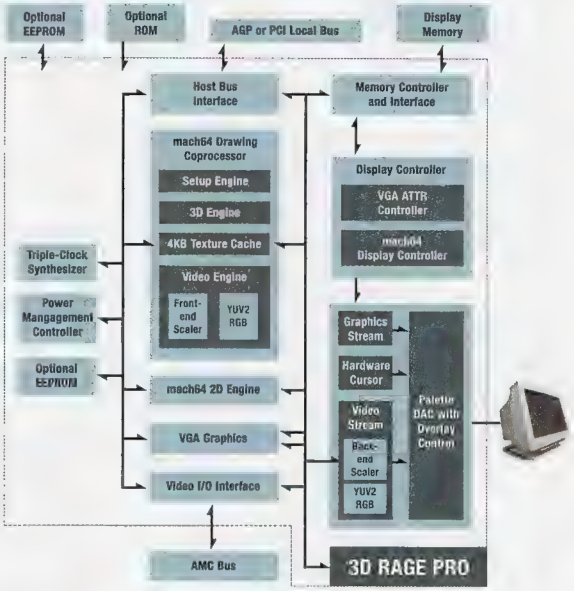
The Tex will eventually be turned into an integrated 2D/3D chip like the PIX3000. More so than any other future architecture, we're rooting for Tex to live up to its promises. If it gets even halfway there, it will change the face of gaming. **page 51>**

RSSI GAME PLAN

chips *PIX3000 and Tex*
available *PIX3000, late Q2 97; Tex, post-Comdex (in a perfect world)*
theoretical fill rate *PIX3000: 100Mpixels/sec; Tex: 256Mpixels/sec (trilinear filtered)*
URL *www.simsys.com*

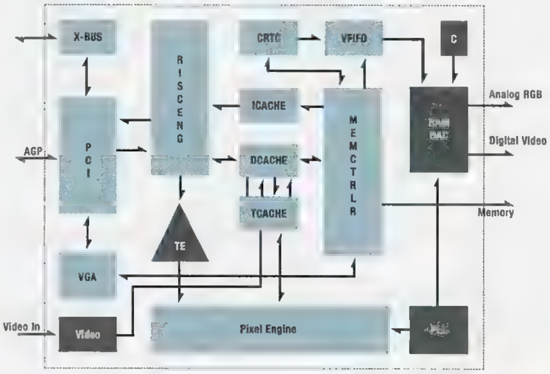
3D Rage Pro

With MPEG2 motion compensation hardware onboard, the Rage Pro should allow DVD movie playback without the need for a separate decoder.


Optional EEPROM
Optional ROM
AGP or PCI Local Bus
Display Memory
Host Bus Interface
Memory Controller and Interface
mach64 Drawing Coprocessor
Setup Engine
3D Engine
4KB Texture Cache
Video Engine
Front-end Scaler
YUV2 RGB
Display Controller
VGA ATTR Controller
mach64 Display Controller
Triple-Clock Synthesizer
Power Mangagement Controller
Optional EEPROM
mach64 2D Engine
VGA Graphics
Video I/O Interface
Graphics Stream
Hardware Cursor
Video Stream
Back-end Scaler
YUV2 RGB
Palette DAC with Overlay Control
AMC Bus
3D RAGE PRO

Rendition

Based around a programmable RISC core, the V2200 can gain new features with time. This flexibility should allow the chip to excel at DVD decoding. The chip complements the RISC with a hardware set-up and rendering engine.

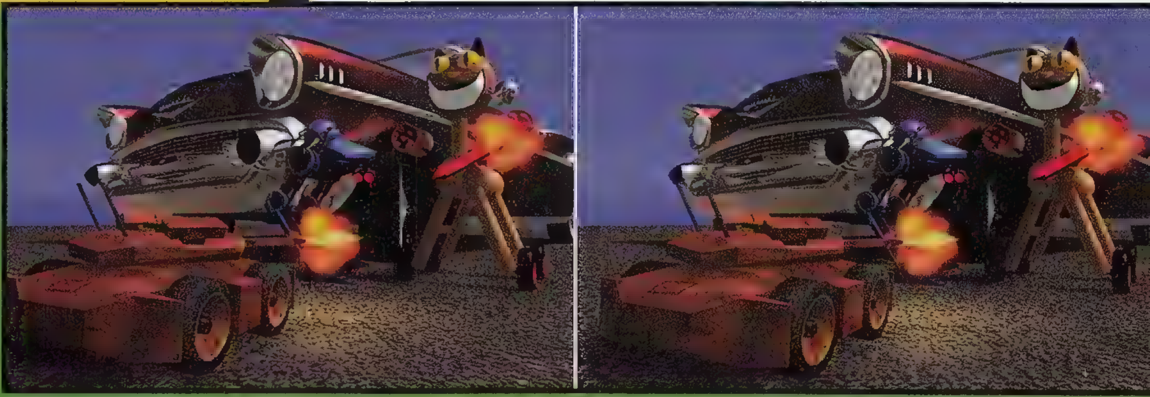

X-BUS
RISCENG
CRTC
VFIFO
C
AGP
PCI
ICACHE
MEMCTRLR
RAM DAC
Analog RGB
Digital Video
DCACHE
TCACHE
Memory
TE
VGA
Video In
Video
Pixel Engine

Accelerator-Only Games:
The Beginning of the End for 3D Have-Nots

With all the benefits that 3D acceleration has to offer, why waste time developing games for plain vanilla systems? Indeed, as 3D cards become de rigueur for casual weekend gamers, designers are working on titles designed from the ground up to take advantage of 3D acceleration. In some cases, these new titles won't even be playable unless you have a high-caliber 3D chip.

Id's Mike Abrash recently gave us a peak into id's 3D-only future and post-Quake graphics engine, Trinity. "Trinity is not just a hardware-only engine; its baseline system is a Pentium Pro 200 with MMX, 32MB, and an accelerator capable of at least 50 megapixels and 300K triangles per second with alpha blending and lighting. Imagine seeing through an open cockpit from one screen to the next, and seeing the action on adjacent screens in detail in real time and you'll have an idea of where things are heading in the near future."

Joan Wood of Mango Grits had some advice for game developers who are starting projects today that don't have 3D acceleration in mind. Don't. "You have to develop for the high end," says Wood, "because by the time you get to market it won't be."



Bumper Tanks *is a stereoscopic 3D title that will only look good with an accelerator. Cross your eyes for a peek at the future.*

THIRD-GEN 3D VIDEOC

3D hardware acceleration: We love it as much as you do. In fact, ever since boot *01, we've dug deep into this exciting product category, reviewing all the evolving technologies as they developed. Below you'll find all the 3D cards and chipsets we reviewed the past year, with their original ratings and new ratings based on today's prices, software support, and competitive market. (Observe the marked differences between old and new ratings for an illustration of how far technology has progressed.)*

CHIP	GUTS	CARDS	DETAILS	VERDICT	REVISED
3Dfx Voodoo [illegible]	*Still holding its own [illegible] 3D chipset, Voodoo has a at last begun to descend to more affordable prices. Remember though, you still need a 2D board to go with it.*	Orchid Righteous 3D, $239 (4MB) [illegible]	*With a smaller bundle and a higher price [illegible]*	91%, *boot 03* [illegible]	8
		Diamond Monster 3D, $199 (4MB) www.diamondmm.com	*With a gigantic bundle and new low pricing, this is currently the card to love.*	91%, *boot 03* page 87	9
		RealVision Flash 3D, $149 (4MB) www.windsoronline.com	*Includes no software bundle, but the amazing price brings Voodoo to the masses.*	to be reviewed in *boot 12*	
3Dfx Voodoo Rush [illegible]	*Voodoo– [illegible]*	Hercules Stingray 128/3D, $299 (6MB) [illegible]	*Lets you do 2D and 3D on one card.*	9, *boot 10* [illegible]	9
[illegible]	*[illegible] polygons, and doesn't need a Z-buffer.*	[illegible]	[illegible]	[illegible]	8
		VideoLogic Apocalypse 5D, $279 (8MB) www.videologic.com	*With 4MB each for the 3D PowerVR and 2D Tseng 6000, this board rocks.*	8, *boot 10* page 70	8
Rendition Vérite V1000 [illegible]	*Based around a pro- [illegible] core, the Vérité is the best combo 2D/3D chip we've seen, only hampered by its poor performance with old (pre-SVGA) games.*	Intergraph Intense 3D 100, $169 (4MB) [illegible]	*Formerly known as the Reactor, this board [illegible]*	8, *boot 04* [illegible]	7
		Creative Labs 3D Blaster PCI, $199 (4MB) www.intergraph.com	*A solid Vérité performer, and can run older CGL-based 3D games.*	8, *boot 04* page 79	7
		Sierra Screamin' 3D, $199 (4MB) [illegible]	*Based on the Canopus design, the Sierra [illegible]*	9, *boot 04* [illegible]	8
		[illegible]	[illegible]	[illegible]	8
ATI 3D Rage II www.atitech.com	*Great 2D, support for high-res screens, and polished drivers. You can almost forgive poor 3D numbers.*	ATI 3D Xpression+ PC2TV, $169 (4MB) www.atitech.com	*Excellent all-around card with beautiful composite and S-video output.*	8, *boot 05* page 98	7
		ATI All-In-Wonder, $285 (4MB) www.atitech.com	*With a TV tuner and video in/out for under $300, a great companion to a 3Dfx card.*	9, *boot 10* page 72	9
[illegible] www.S3.com	*[illegible] with built-in 3D, chances are you're cursed with a ViRGE "decelerator." [illegible] support for VRAM, making it a reasonable choice for working with high-res 2D.*	[illegible] www.nine.com	*[illegible] with Screamer, a great native game.*	[illegible] page 78	2
		Orchid Fahrenheit Video 3D, $81 (2MB) [illegible]	*Another blah ViRGE-based card. Comes [illegible]*	70%, *boot 02* [illegible]	2
		Diamond Stealth 3D 3000XL, $299 (4MB) www.diamondmm.com	*Slightly slower than the Velocity 3D but offers a bigger bundle and better drivers.*	6, *boot 06* page 91	5
		[illegible]	[illegible]	[illegible]	5
S3 ViRGE/DX and ViRGE/GX www.S3.com	*The second-gen of ViRGE adds better video support and improved 3D speed, but S3 still has a [illegible]*	Hercules Terminator 3D/DX, $149 (4MB) www.hercules.com	*A poor implementation based on a weak chip.*	4, *boot 10* page 98	4
		Diamond Stealth 3D 2000 Pro, $149 (4MB) [illegible]	*Now at a lower price, this board provides [illegible]*	6, *boot 10* [illegible]	7
		STB Nitro 3D, $149 (4MB) [illegible]	*With great pack-ins, it's like buying a bunch [illegible]*	7, *boot 10* [illegible]	7
Matrox MGA-1064SG www.matrox.com	*No effects, but great 2D.*	Matrox Mystique, $169 (4MB) www.matrox.com	*Gives you a PlayStation look and feel on your PC. At least it's fast.*	84%, *boot 02* page 79	7
Cirrus Logic Laguna 3D	*Fakes bilinear filtering and does bad perspective correction. But it is cheap.*	VideoLogic GrafixStar 550, $99 (4MB) www.videologic.com	*With a meager bundle and performance, don't be swayed by the bargain price.*	3, *boot 10* page 76	3
		Creative Labs Graphics Blaster 3D, $99 www.creativelabs.com	*Bad bundle, poor performance, not even worth the price.*	3, boot 10 page 76	3

from page 49

S3:
Seeing Double

The S3 ViRGE chipset has been one of the bootLab's favorite whipping posts despite improvements to ViRGE/VX, DX and GX. It's not that we *like* picking on the OEMs' favorite motherboard pal. It's just that we can't endorse lousy performance in an age of grand advancements.

No matter which version of ViRGE you're talking about, S3's chip legacy has earned its reputation for being clunky and underpowered. The third generation of the ViRGE chip, the GX2, carries forth the same bolt-on 3D architecture. Sure, it cranks it up another notch in speed, but it's still nothing to get steamy about.

Is S3 R&D a complete hole of shoveldom? No. S3 has one very impressive ace up its sleeve: The GX2 will be the first chip to support dual displays.

Though it won't be fully exploited until Memphis (A.K.A. Windows 98), S3's DuoView technology will allow you to display separate images on the TV-out and monitor, each with independent resolutions and refresh rates. S3's competition won't have this feature until their fourth wave of chips. (It should be noted that since Memphis won't be released until 1998, S3 may no longer have an industry advantage by the time all the pieces are in place for dual displays.)

The ViRGE/GX2 supports up to 100MHz SGRAM and provides a 1x DMA-only AGP implementation—even though S3 doesn't believe in the overall value of AGP. Neal Margulis, senior vice president of R&D at S3, told *boot*, "AGP is [an example of] Intel pushing people to do something that doesn't make a lot of technical sense."

Though S3 is likely to lose a lot of ground (and motherboard deals) to the relentless ATI this fall, don't count 'em out anytime soon. S3 has enough resources to weather the storm and is working on a new 3D architecture from the ground up. Margulis says, "In the first quarter of '98 you'll see a huge discontinuity as we bring out a new architecture with 3Dfx-like performance."

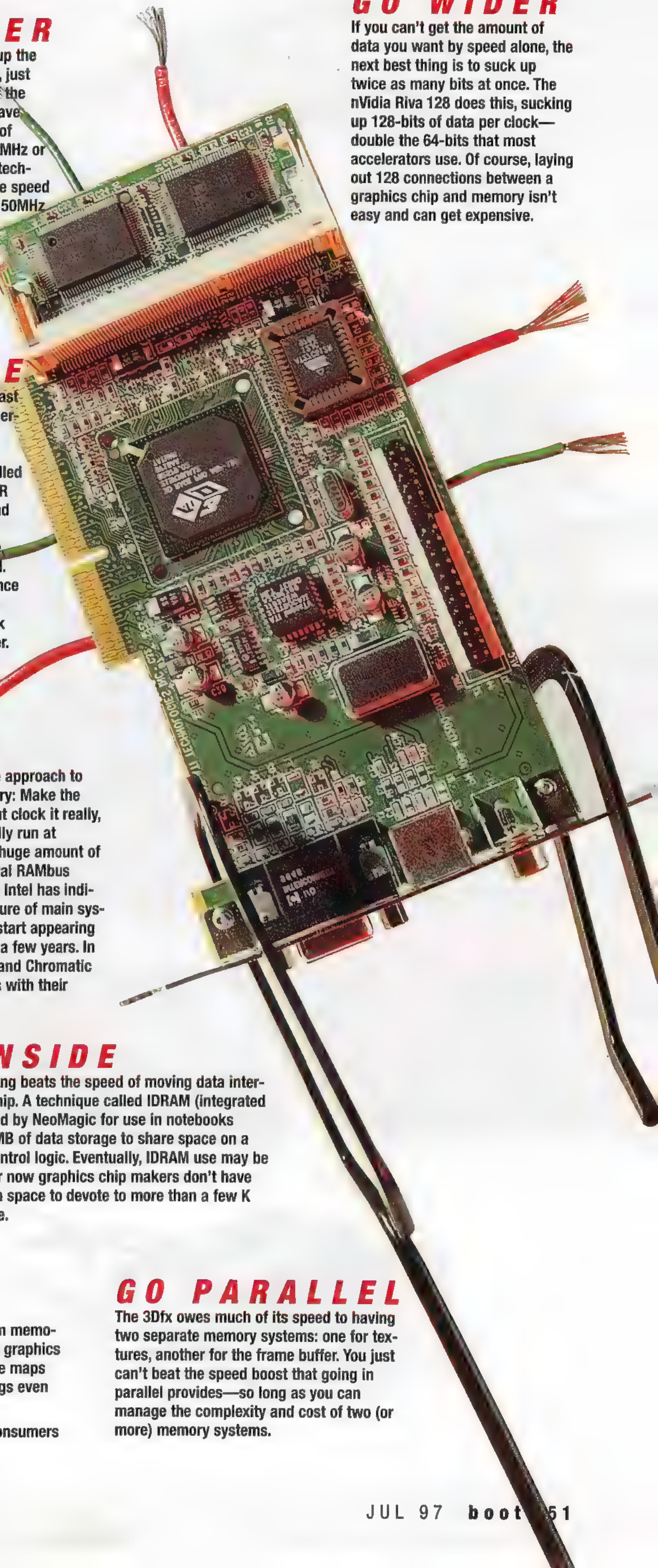
Now finding *that* soldered on your motherboard would be a nifty surprise!

S3 GAME PLAN

chips *ViRGE/GX2*
available *July 97*
theoretical fill rate *30Mpixels/sec*
show-off titles *GoMan*
URL *www.s3.com*

MEMORY MADNESS

Realistic 3D experiences rely on cutting-edge effects and fast frame rates—fall short in either area, and you're just not playing with the big boys. By necessity, as you push visuals and frame rates, the speed by which you access memory must follow apace. EDO DRAM? Fawgedaboudit. It just can't keep up. To get at memory ever-faster, the third-generation chips profiled in this article use a whole host of nifty techniques and exotic architectures.



GO FASTER

The simplest way to crank up the speed to memory is to, well, just crank up the speed. Most of the newest graphics chipsets have ditched EDO DRAM in favor of SGRAM clocked at either 83MHz or even 100MHz. New SGRAM technologies promise to have the speed motoring along at close to 150MHz before too long.

GO WIDER

If you can't get the amount of data you want by speed alone, the next best thing is to suck up twice as many bits at once. The nVidia Riva 128 does this, sucking up 128-bits of data per clock—double the 64-bits that most accelerators use. Of course, laying out 128 connections between a graphics chip and memory isn't easy and can get expensive.

GO TWICE

Even 150MHz SGRAM isn't fast enough to feed the 3D accelerators of the future, so the SGRAM industry is pushing hard to define a protocol called Double Data Rate (DDR). DDR allows memory chips to send data on both the rising and falling edge of a clock pulse, doubling the effective speed. DDR may make an appearance in graphics cards come late '98, but for now it's only talk around the R&D water cooler.

GO THIN

RAMbus has taken a unique approach to designing its RDRAM memory: Make the channel only 8-bits wide, but clock it really, really fast. RDRAM is typically run at 600MHz, and can provide a huge amount of potential bandwidth if several RAMbus channels are run in parallel. Intel has indicated that RDRAM is the future of main system memory, and it should start appearing on system motherboards in a few years. In the meantime, Cirrus Logic and Chromatic Research are using RAMbus with their graphics chips.

GO INSIDE

Ultimately, nothing beats the speed of moving data internally within a chip. A technique called IDRAM (integrated DRAM) pioneered by NeoMagic for use in notebooks allows several MB of data storage to share space on a chip with the control logic. Eventually, IDRAM use may be common, but for now graphics chip makers don't have the spare silicon space to devote to more than a few K of on-chip cache.

GO PARALLEL

The 3Dfx owes much of its speed to having two separate memory systems: one for textures, another for the frame buffer. You just can't beat the speed boost that going in parallel provides—so long as you can manage the complexity and cost of two (or more) memory systems.

Exactly What is AGP?

AGP: Accelerated Graphics Port

1 **A new bus that complements PCI to allow the graphics chip fast access to main system memory. Comes in 1x (66MHz) and 2x (133MHz) flavors. Can run in "execute" mode, in which the graphics chipset can read texels directly from main memory; or "DMA" mode, in which entire texture maps must first be transferred to the graphics card memory. "Sideband addressing" speeds things even more.**

2 **A feature that Intel will only be enabling on Pentium-II motherboard chipsets, hoping consumers will look for "AGP," while ignoring "AMD."**

3Dfx™
interactive

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Get Voodoo.

Product Information Number 374

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12-STEP

DEALING WITH YOUR **PC OBSESSION**
DAY TO DAY BY BREAKING IT DOWN
INTO 12 **EASY** STEPS

TRY IT ON THE DISC

The 15-Minute Quake Level

by T. Liam McDonald

So you've seen Quake levels on the Internet*—Aliens Quake, Borg Quake, Podunk High-School Quake—and you want to see if you can do one yourself. Until Virtus* Deathmatch Maker *came along the only choices were some shareware level-design utilities that were well-made, but difficult to use. That process is made radically easier with* Deathmatch Maker, *so you can craft multiple levels with greater ease. With a simple set of tools you can join the ranks of* Quake*-level creators and let your imagination run wild. We've even provided the software on this month's* bootDisc.

1

Custer Had a Plan

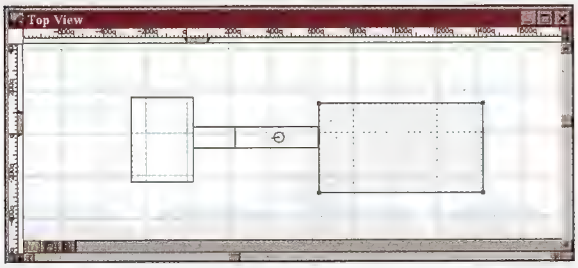
Before you get down to building your level, take some time to plan it. Draw an outline of the type of level you want to make, showing how the rooms will link and flow together, where doors and lifts will be, how it will be played, and whether it will be solo or deathmatch. Just slapping together squares is a sure way to make a boring level that plays badly. A level should flow smoothly, yet should be broken up enough architecturally to create an interesting experience. Look at what makes the best levels good and take it from there.

2

Laying the Foundations

Start working in *Deathmatch Maker* with the Design window active. This is the drafting board for your level, where you piece together all the elements. We'll start with a simple level that introduces the basic ideas of level creation. You'll be pulling premade rooms and objects from the galleries to the left of the Design window.

First, drag a large room, a large room with doorways, a sloping hallway, and a hallway from the Roomsnhalls gallery into the work area. Line them up using the top view so the edges of each are just touching. The keyboard arrows are the best way to do this.



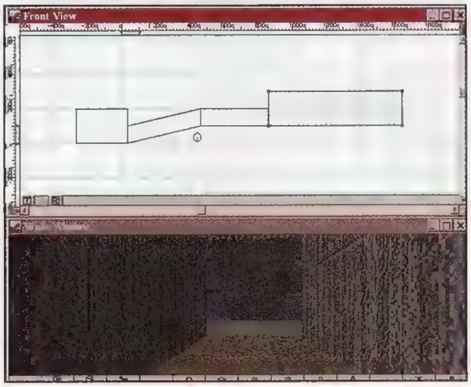
Creating a *Quake* level is like drafting a blueprint on graph paper. You need to draw a lot of squares.

3

Hammer and Nails

Switch to the front view to align the objects vertically. You are building a level that begins in a small room with a ramp up to a long hallway that opens into a larger room. The large room will therefore be "above" the small room.

The Connection tool (the hammer and nail icon) enables you to connect all these rooms so they flow together into a single level. Connecting rooms automatically forms doorways from one room to the next. At this point we're also going to make the large room taller. Do this by grabbing one of the black boxes ("handles") in the upper corner of the room square and dragging it upward.



Once these objects are in your work area, you can align them so they form a continuous level. Using the various views helps align objects both vertically and horizontally.

4

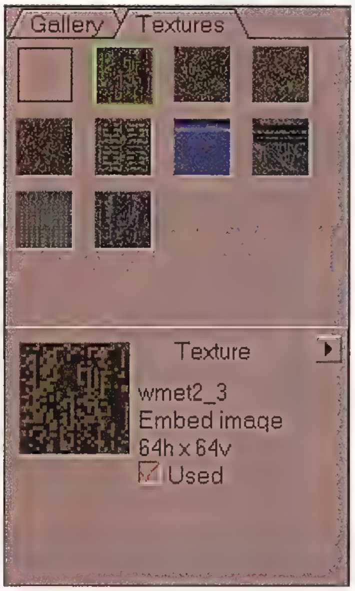
Getting Around

You'll want to walk through the level to see how things look as you place them. You can do this best using the 3D-View window and going room to room, so let's position the location icon (the circle with the line coming out of it) in the first room. With the 3D-View window active you can use the arrows to steer this view around the levels. The navigation icons on the bottom of the 3D view also help move the viewpoint around. Since the level isn't "solid" yet, use the Up button to climb ramps. You can also click on the location icon and drag it around in the Design window.

5

Paint the Town Brown

Now that you can move around the level, it's time to start painting the walls. *Quake* isn't known for its colorful graphics palette, but there are some choices for dressing up plain walls. Click on the Textures tab to bring up different wall and floor textures. Click on the Smetal texture, hold the mouse button down, and drag the texture over to the wall where you want it. Experiment with colors and textures to get the look you want.



wmet2_3
Embed image
64h x 64v
☑ Used

A few textures are included in *Deathmatch Maker*, including special textures such as lava and signs.

6

Placing Objects

Now the real fun begins. You're going to place an object in the level. Let's start with some weapons by opening the Guns and Ammo gallery. Drag a few weapons of your choice from the gallery into the small room. Start with a nailgun, some nails, and a super shotgun.

Might as well give yourself all the help you can get, so open up the Power-ups gallery and put a quad damage and some green armor in the small room.

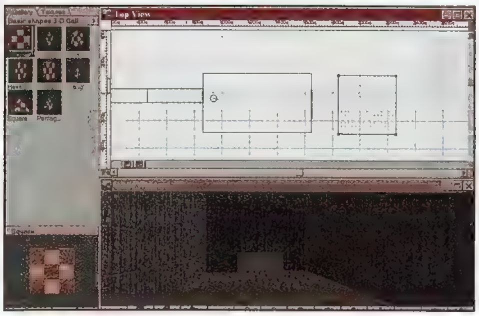
Just about any object you'll find in *Quake* is included in *Deathmatch Maker*. Just drag and drop to place them in a room.

7

A Room With a View

Let's make the large room more interesting by giving it an elevator and a loft. Go to the Basic Shapes gallery and select the square, dragging it into the work area above the level. This is a simple box, but we can use the black handles to change its shape any way we like.

Using the front view, flatten it out so it's only about 10 units thick (the units are the little hash marks along the side and top of the work area). Then, using the top view, stretch it so it's the entire length and about half the width of the large room.



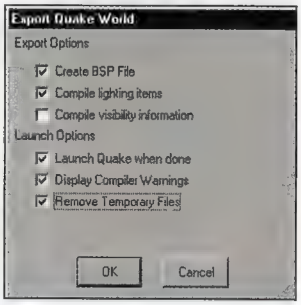
Using the Basic Objects gallery, you can create any shape or object you can think of by stretching and texturing simple forms.

8

An Uplifting Experience

When the floor is made and sized, drag it into the main body of the larger room, aligning it halfway up the height and all the way to the back.

To get to this loft, we need a lift. Drag out another square and flatten it like you flattened the first (using the front view), but leave it the same width and length. Now you have a flat square. Place it at the edge of the loft up against the wall.



Export Quake World

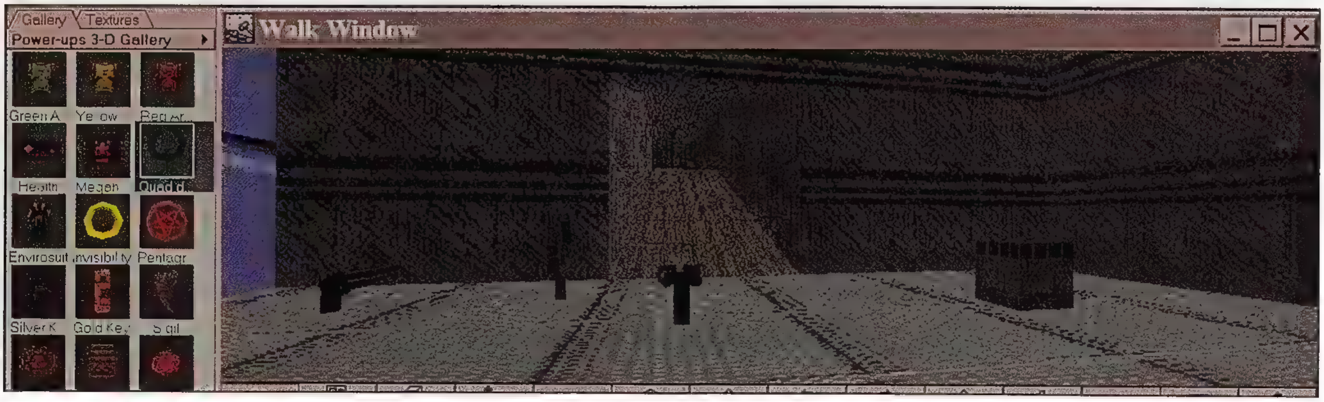
Export Options

☑ Create BSP File
☑ Compile lighting items
☐ Compile visibility information

Launch Options

☑ Launch Quake when done
☑ Display Compiler Warnings
☑ Remove Temporary Files

Each object in your *Quake* level can have its properties edited by right-clicking on it. This can turn objects into lifts, weapons, monsters, or other active items.



9

Height and Speed

We have to give this lift the properties that make it work. Right-click on the lift and the property window pops up. Under Object/Class, scroll down until you reach Platform/Lift. Select it.

Now choose the Attributes tab. The loft in this design is about 240 units off the floor, so we enter that number in the height box. (This will vary from design to design. Use the hash marks along the side to determine how high a lift needs to go.) Now drag the lift box down to floor level (the front view is best for this) and leave it there. When you step on it in the game, it will rise to the loft level.

10

Monster Mash

Choose some monsters from the Bad Guys gallery and drop them on the loft in the larger room. You'll need to align them using both top and front views or else they might not be on the level, but floating in space. Only pick a few of the little guys this time. You may also want to put some health and some more ammo on this level as you get ready to fight.

11

Let There Be Light

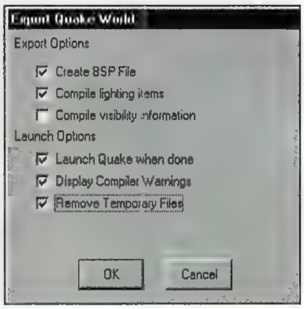
The final step is to add light sources to your level. This is the toughest part of design because you need to strike the right balance between light and shadow. You don't want it too dark or too bright. Put a couple of torches around the big level, a yellow flame in the hall, and a light globe in the starting room. Finally, move your location icon back to the small room—this will be the starting room.

12

Get Ready to Rumble

The final step is to compile and play your level. First, save it to the hard drive. Then go to the File menu and choose Quake Export. Select "create BSP" and compile light and visual elements. Hit OK and the level will build itself. The launch mode doesn't work very well so you'll need to launch the game the old-fashioned way.

The best way to do this is to use a utility such as *LaunchQ*, which is on the *Deathmatch Maker* disc. Install it and select your level from the menu. In a few minutes you'll be gibbing inside your creation.



Export Quake World

Export Options

☑ Create BSP File

☑ Compile lighting items

☐ Compile visibility information

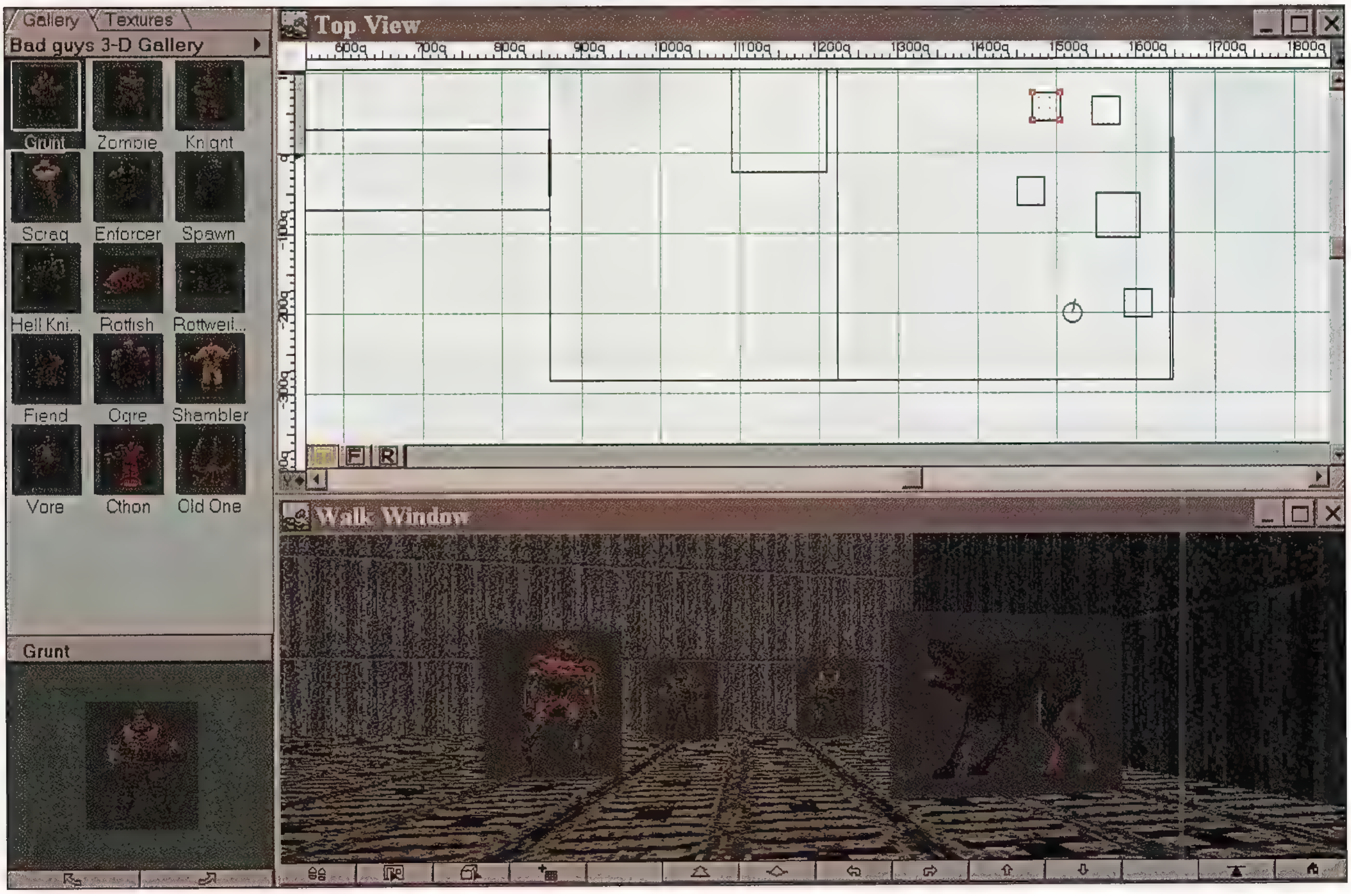
Launch Options

☑ Launch Quake when done

☑ Display Compiler Warnings

☑ Remove Temporary Files

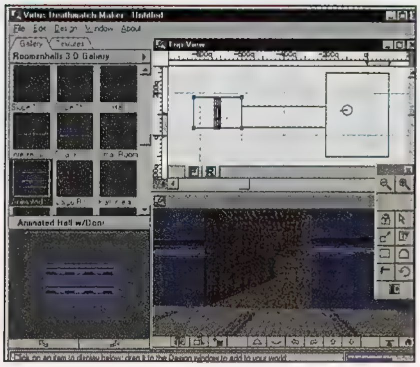
If you export it they will frag.



Gallery
Textures
Bad guys 3-D Gallery
Grunt
Zombie
Knight
Scrag
Enforcer
Spawn
Hell Kni...
Rotfish
Rottwei...
Fiend
Ogre
Shambler
Vore
Cthon
Old One
Grunt
Top View
600q
700q
800q
900q
1000q
1100q
1200q
1300q
1400q
1500q
1600q
1700q
1800q
-100q
-200q
-300q
Walk Window

Well-placed monsters are the final touch to a good level.

REVIEW


Virtus Deathmatch Maker - Untitled
File Edit Design Window About
Gallery
Textures
Roomshalls 3 D Gallery
Top View
Animated Hall w/Door
Click on an item to display below; drag it to the Design window to add to your world

Virtus eliminates the challenge in making *Quake* levels.

Deathmatch Maker

TRY IT ON THE DISC

Until now, building your own *Quake* levels was a laborious process reserved for the most devout minions of Cthon. Laying out, light-sourcing, and compiling were time-consuming procedures only available through a few cumbersome shareware utilities. Virtus has changed all that by converting the technology behind their *Walkthrough Pro* 3D environment-rendering software into the most easy-to-use level creator ever unleashed on the marketplace.

Deathmatch Maker is based around three easy-to-understand windows: a workspace, a rudimentary 3D view of the world as it takes shape, and a set of ready made and highly customizable object and texture galleries. Simply drag an object from the gallery to the workspace and it becomes part of your *Quake* level. Linking these objects together makes them a single fluid level. By dragging and dropping new textures on 3D objects you can change their appearance, and a fair range of original *Quake* textures, such as animated and special textures, are included.

Once the level layout is roughed out, you can populate it with the complete roster of monsters, power-ups, weapons, objects, and sounds. The often painful task of light sourcing is simplified by placing actual "lights" around a level. New objects can be created from scratch and assigned complex properties such as damage, lift, and luminescence, turning them into monsters, lights, elevators, doors, and traps. By assigning simple values, a flat square turns into a lift, a room becomes a pool of water, and a triangle attacks for 10 damage.

The huge gallery of premade items and objects make creating a sharp-looking level painfully easy, almost too easy, since now even more crummy levels can be built and dumped on the web. There are some drawbacks. As expected, it's a system hog, and sometimes needs to be shut down and restarted as it eats available RAM. The auto-level start doesn't work, the tutorial is good but support documentation is mediocre, and there is no online help (a big failing). A major loss is the lack of an internal texture-importing utility—you have to use the cumbersome *MipMap* shareware (provided on the *bootDisc*) to import new textures.

Still, it's better than anything else out there and shows how much power good technology can give the average gamer to create their own world.

boot verdict 8

product info

Price $30 **Developer** Virtus
Publisher Macmillan Digital Publishing
Phone 800.847.8871
URL www.deathmatchmaker.com

Adventures in Overclocking

I read the overclocking article in *boot* 05 with great enthusiasm. I've heard of people doing this, but I was so sure that the CPU would fizzle that I never tried it myself.

But with the assurance of a bona fide magazine article, I took the plunge with an OcTek Hippo-12 motherboard with three PCI, two VLB, and three ISA slots. The CPU is a Cyrix 5x86-120. I have a VLB SCSI-II card connected to a 9-year-old Micropolis 1.5GB drive and a much newer 500MB hard drive. The Micropolis drive is a differential SCSI, so I have an adapter card that resides between the SCSI card and converts it to single-ended SCSI. I have 32MB of true parity RAM on two 16MB, 72-pin SIMMS.

Tripling a 40MHz bus speed obtains the 120MHz speed. Tripling is the highest clock multiple available, and I was already there, so I bumped the clock speed to 50MHz, hoping to obtain a 150MHz machine. No way. Nothing. It didn't pump a pixel on the screen. So, out of curiosity, I set the multiple to double. The BIOS initiated, ran the memory test, but the Green PC symbol never faded. So I set the multiple to 2.5 (that makes sense, huh? It doesn't work at 2, so I up it even more). It did the same thing, but this time it reported a Cyrix 5x86 CPU at 75MHz, which seemed odd, since it correctly identified itself as a 5x86-100 when doubled, and it has always reported a 5x86-120 at the usual setting of 40 tripled. So I put the thing back the way it's always been (why fix something that ain't broke?).

I ran *SysChk* from the 05 *bootDisc* and it reported a CPU speed of 87MHz. Could it be that the Cyrix 5x86 chip isn't recognized by *SysChk*? Next I tried *Norton Utilities System Information Benchmark*. It reported a CPU speed of 106.95MHz. Now, nothing but the BIOS is accusing my CPU of running at 120MHz. Have I been ripped? By whom? I was led to believe that a Cyrix 5x86 running at 120MHz is the equal to a Pentium running at 90MHz, but Norton's *System Benchmark* gave my computer a 13.2, and a Pentium 90 gets a 20.4. So what the hell is my CPU speed?

Matrix

Cyrix responds: *Don't rely on software to calculate and identify your CPU clock speed. Most software programs base the frequency calculations on "clock counts per instruction," which are not the same for different CPUs and architectures.*

The safest method of determining your clock speed is to identify the CPU input clock (based upon your MB settings) and then calculate it based upon the core/bus clock settings on your MB. The BIOS should also correctly display the 5x86MHz. (i.e., if your bus frequency is 40MHz and the core/bus ratio is 3x, your core is at 120MHz no matter what the software tells you).

One System, Two Accelerators

I have an Intense 3D 100 from Intergraph . You've stated that it's possible to have both a Vérité and a 3Dfx card in one computer, and have games accelerated on them without any problems. Intergraph, however, states that the Intense 3D's BIOS automatically shuts off any other video cards in the system. So how did you manage to have two cards living together in peace?

F-Phreak

Technical editor Chris Dunphy replies: *The rule is that you can only have one VGA chipset in a system. The 3Dfx accelerators are 3D-only with no 2D or VGA onboard, so they happily coexist with other graphics cards. In fact, just for fun, we've outfitted a system with PowerVR, 3Dfx, and Vérité cards all living in harmony. Native 3D titles for each chip run fine, but when you have several Direct3D-capable cards competing, things get a bit flaky and it becomes hard to control which accelerator a game runs on.*

Dual-Boot Troubleshooting

Here's some more information for readers who are running into problems setting up a dual-boot system.

Read the FAQ.TXT file in your WINDOWS directory. In the sections about dual-booting, you may come across a message like the following: Windows 95 version 4.00.950B does not support dual booting to a previous MS-DOS/Windows 3.x installation.

Check your version. You may not be able to dual-boot. The FAQ.TXT is different for each version of Win95. If your version can't dual-boot, and you went through the steps of copying the system files and booted the system to the previous version of MS-DOS, your system most likely did not boot to Win95 afterward. Do not panic! To recover, simply boot the system using your Emergency Boot Disk for Win95 (if you created one), then from the boot floppy prompt, type SYS C:. A message may appear asking if you want to proceed to replace an existing MS-DOS or other type of operating system. Proceed with a (Y)es. Once the system is transferred you should be able to boot from the fixed disk.

Lawrence B. Froment
Froment Programmings

More levels than a Tokyo skyscraper

Tanks, bulldozers, boats, forklifts: Drive to kill

Hand to face combat mode: Kick butt karate-style

WHO WANTS SOME WANG?

Shadow Warrior is here. Lo Wang.

#1 Assassin. #1 Yakuza abuser.

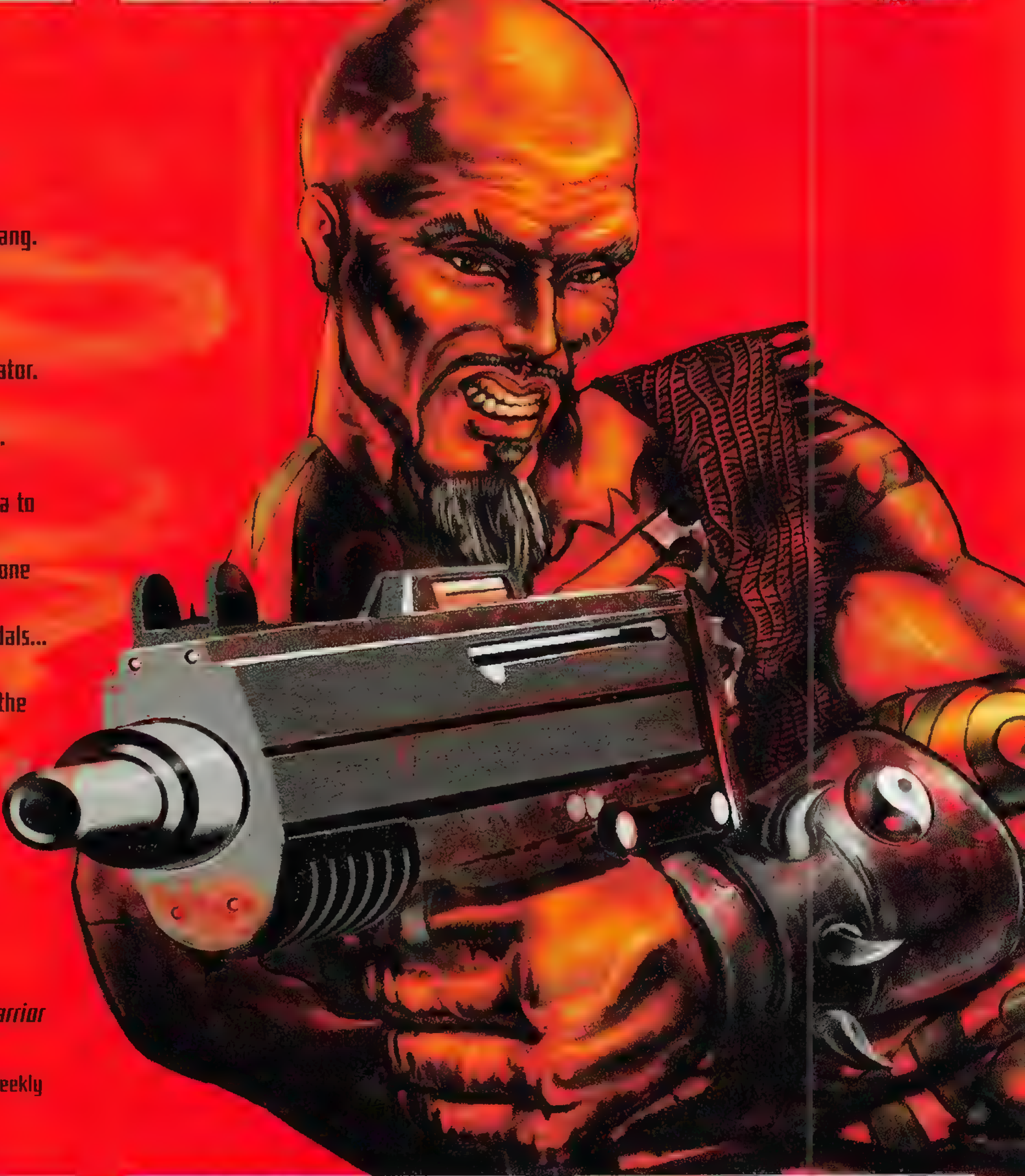
#1 Freak fragger. #1 Mutant mutilator.

#1 reason to be scared of the dark.

#1 Son-of-a-Bitch. So say Sayonara to all the Ninja wannabes that have gone before and put on your combat sandals... Lo Wang is coming to the Land of the Rising Sun to turn out the lights. Shadow Warrior.

The Zen is going to hit the fan.

"There's no doubt that Shadow Warrior cremates the competition."
GameSlice Weekly



Fog, multi-colored lighting, transparent water...total immersion.

More hi-jinks, Lo-Wang speak, and total interaction than Duke Nukem 3D

8-Player Wangbang (deathmatch), Co-Op and Team Play modes with all-new Handicapping option.

Throwing stars, Uzis, 4-Barrel shotguns and more!

Swim, climb, drive, go anywhere, do anything!

Rotating 3D gun turrets to mow down enemies

FRESH FROM THE CREATORS
OF DUKE NUKEM 3D™

Lo Wang™ is
Shadow Warrior™

GET YOURSELF A SLICE OF
THE ACTION IN STORES...NOW!

or download the shareware at
www.shadowwarrior.com

All-new Build Editor for designing
and destroying your own environments

RATING PENDING
RP
CONTENT RATED BY
ESRB

www.ten.net

developed by

3D REALMS

www.3drealms.com

GT Interactive Software

www.gtinteractive.com

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Product Information Number 155

bootWORTHY

EACH MONTH, **BOOT** EDITORS GATHER THE **BEST** PRODUCTS IN A SPECIFIC **CATEGORY** AND DEEM THEM: **BOOTWORTHY**

KILLER CONTROLLERS

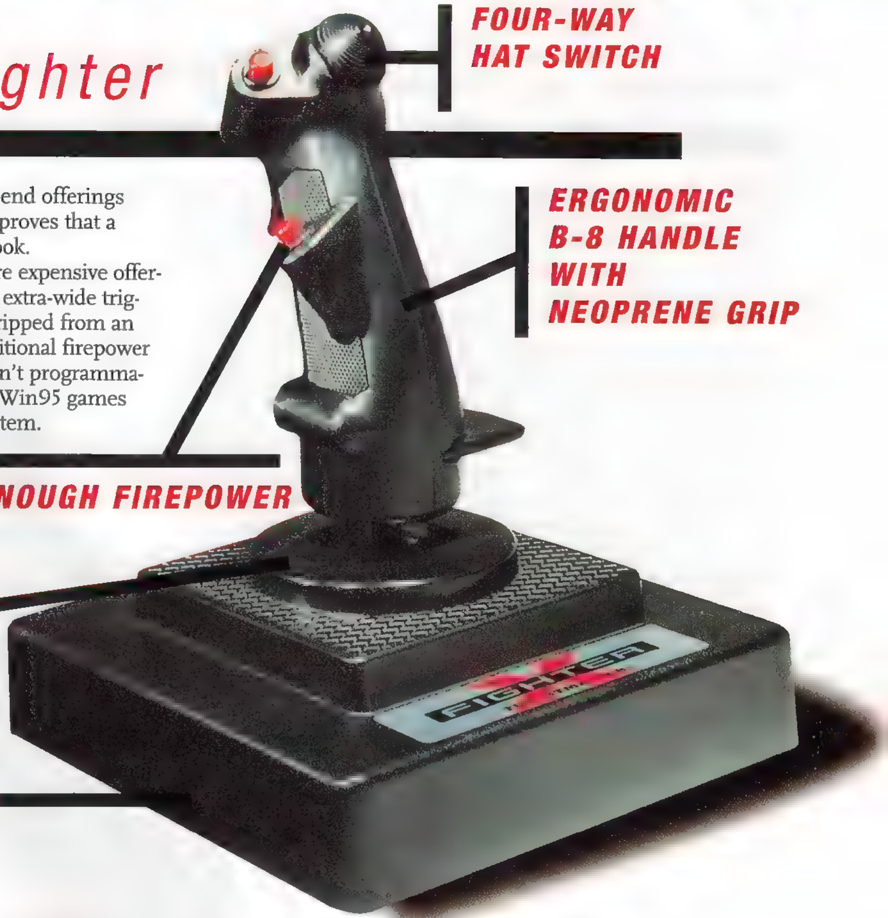
There once was a time when the keyboard was more than adequate for computer games. Those days are long gone. Action-intensive games require precision moves and speedy button responses, so traditional keyboards just won't cut it anymore. Oh, sure, there are still those hordes of *Quake* fanatics who won't frag with anything else. But for the rest of us, the game controller is the only piece of hardware that'll quickly—and unmercifully—separate the men from the boys, the winners from the losers, the living from the dead.

Game pads, joysticks, throttles, and new what-the-hell-were-they-thinking-of 3D controllers all vie for your moolah, but which should you buy? It depends on the type of adrenaline-inducing action you crave, but it's doubtful that one controller can satisfy all your gaming needs. Fancy yourself a self-respecting gamer? You'd better own at least one joystick and a game pad. Hardcore game junkies own more. Hell, game fanatics will buy a controller to use with a specific game.

Before we define the short list, keep in mind that every game controller should be programmable, functional, and, if at all possible, digital. Remember, just because it costs more, doesn't mean you'll score more. Above all, try before you buy. If the controller isn't comfortable for extended periods of time, you might as well cut off your hands and play with your feet. — *Bryan Del Rizzo*

PHOTOGRAPHS BY GABRIELLE REVERE

Flight-Sim **Fanatic** X-Fighter


FOUR-WAY HAT SWITCH
ERGONOMIC B-8 HANDLE WITH NEOPRENE GRIP
MORE THAN ENOUGH FIREPOWER
HANDY WRIST REST
SOLID, WEIGHTED BASE
FIGHTER

Hardcore flight jockeys have traditionally turned to high-end offerings from ThrustMaster and CH Products, but the X-Fighter proves that a great joystick doesn't have to ground you in the pocketbook.

The X-Fighter has everything you'd expect from more expensive offerings, including a weighted base, four-way hat switch, and extra-wide trigger. The full-size neoprene grip (kids need not apply) is ripped from an actual B-8, and is replete with three more buttons for additional firepower and a much-needed wrist rest. Although the X-Fighter isn't programmable as a stand-alone joystick, it's compatible with DOS or Win95 games that recognize the older ThrustMaster Flight Control System.

The X-Fighter's ergonomic handle and geared potentiometers provide precise control, making it perfect for flight sims. It also incorporates a conical spring design for extremely realistic gameplay (the farther from center you move, the stronger the tension).

product info

Price $60
Company ThrustMaster
Phone 503.615.3200
URL www.thrustmaster.com

Fragfest SpaceOrb 360

The SpaceOrb 360 has a tough learning curve, but once you've mastered it, there's no turning back.

With 6 degrees of freedom, six programmable buttons, and an innovative rubber ball measuring pressure and angle of movement, the SpaceOrb 360 provides an utterly unmatched gaming experience.

The palm-size ball doesn't actually spin, but is used to carefully control speed and direction of movement, and with 6 degrees of control, the SpaceOrb 360 doesn't limit you in the execution. You can circle-strafe, slide, and jump without a hitch. In games such as *Quake* and *Duke Nukem 3D*, you'll quickly discover how to perform unconventional moves—such as spirals and sharp-angled turns—much to your opponent's dismay.

The SpaceOrb connects to the PC via a free serial port and includes more than 50 control settings for DOS and Win95 games such as *Quake*, *MechWarrior 2*, and *MDK*. The setup programs let you change the controller orientation and adjust the axis sensitivity to your skill level and preference.

product info

Price $99
Company Spacetec IMC
Phone 508.970.0330
URL www.spacetec.com

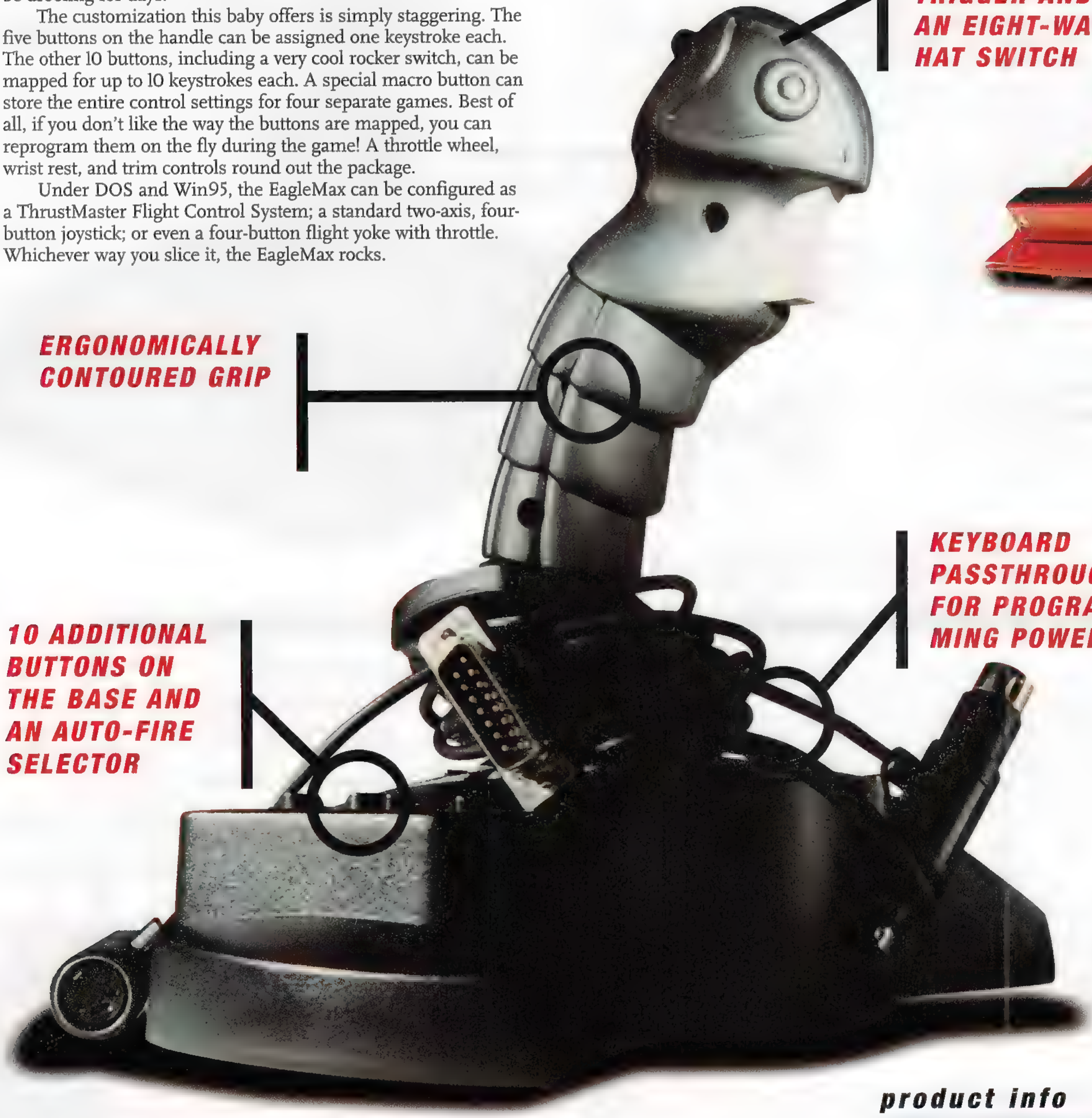
DOS AND WIN95 PROGRAMMING INTERFACES
EXTREMELY COMFORTABLE RUBBER BALL
SIX BUTTONS CAN BE PROGRAMMED

Programming Dream EagleMax

The EagleMax is a great multipurpose controller, equally suited to flight sims, action arcade games, and even—dare we say it?—fighting games. Factor in gobs of programming power and you'll be drooling for days.

The customization this baby offers is simply staggering. The five buttons on the handle can be assigned one keystroke each. The other 10 buttons, including a very cool rocker switch, can be mapped for up to 10 keystrokes each. A special macro button can store the entire control settings for four separate games. Best of all, if you don't like the way the buttons are mapped, you can reprogram them on the fly during the game! A throttle wheel, wrist rest, and trim controls round out the package.

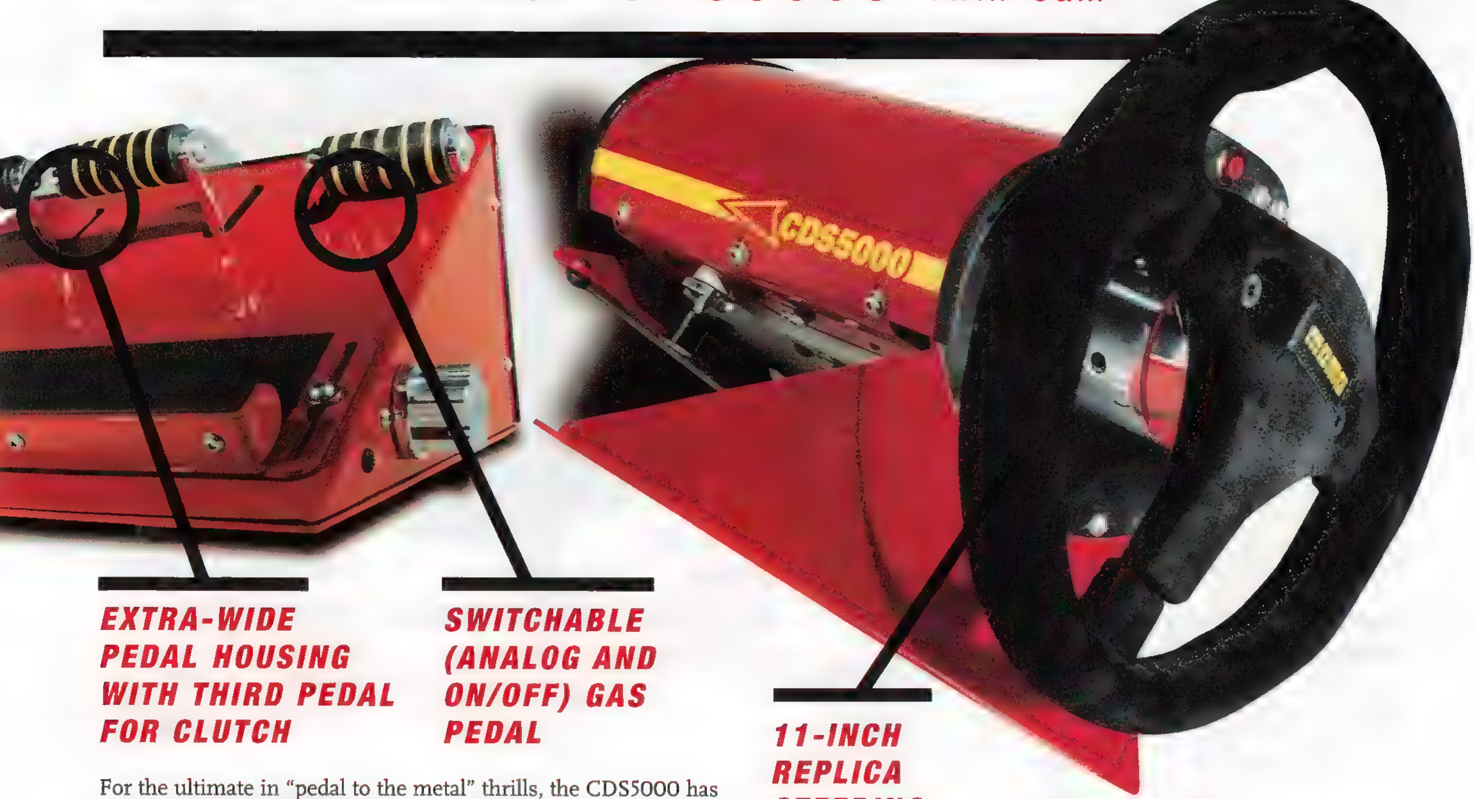
Under DOS and Win95, the EagleMax can be configured as a ThrustMaster Flight Control System; a standard two-axis, four-button joystick; or even a four-button flight yoke with throttle. Whichever way you slice it, the EagleMax rocks.


FIVE BUTTONS, INCLUDE A TRIGGER AND AN EIGHT-WAY HAT SWITCH
ERGONOMICALLY CONTOURED GRIP
KEYBOARD PASSTHROUGH FOR PROGRAMMING POWER
10 ADDITIONAL BUTTONS ON THE BASE AND AN AUTO-FIRE SELECTOR

product info

Price $60
Company ACT Laboratory
Phone 800.980.9997
URL www.actlab.com

The Cure for **Road Rash** CDS5000 Twin-Cam


EXTRA-WIDE PEDAL HOUSING WITH THIRD PEDAL FOR CLUTCH
SWITCHABLE (ANALOG AND ON/OFF) GAS PEDAL
11-INCH REPLICA STEERING WHEEL
CDS5000

For the ultimate in "pedal to the metal" thrills, the CDS5000 has pole position, and at $1,595, it may be the most expensive controller ever. However, the CDS5000 is worth every penny.

The CDS5000's feature list reads like a who's who of the racing circuit. It's equipped with customizable spring tension for steering resistance, user-tunable fluid-damped steering; an adjustable steering lock; frictionless pedal design for enhanced heel-to-toe use; a user-tunable air compression brake system for unparalleled braking feel and realism; and cam-articulated throttle-pedal action. Phew.

The CDS5000 is made of high-quality aluminum and stainless-steel parts, and even includes a special-edition 11-inch MOMO steering wheel covered in hand-stitched black suede leather. The controller comes with a two-year limited warranty and works with any DOS and Win95 driving game that supports traditional joysticks.

product info

Price $1,595 (custom order only)
Company Extreme Competition Controls
Phone 612.824.6733
URL ourworld.compuserve.com/homepages/extreme

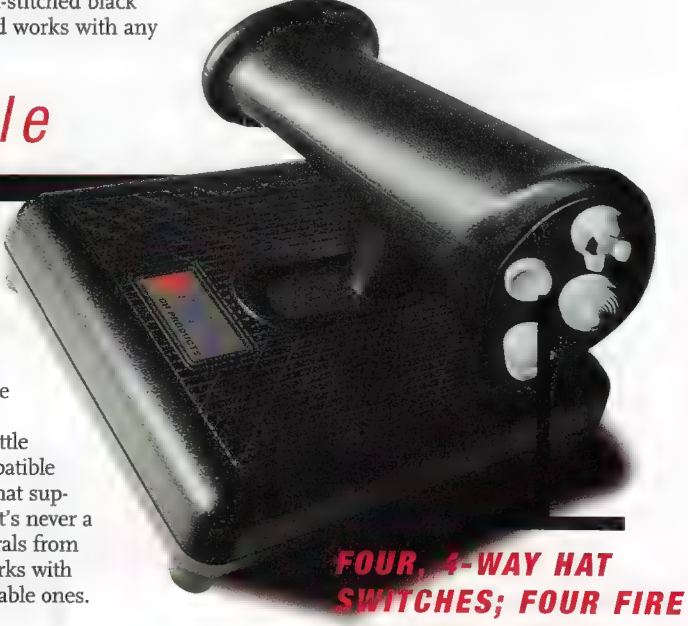
Cranking **Throttle** Pro Throttle

Serious flight aficionados are always on the lookout for products that add realism and control to their flights of fancy. The Pro Throttle is one such product. The throttle itself doesn't arc, but slides back and forth. A bevy of buttons provide 20 independent functions: four 4-way hat switches and four buttons, all of which are programmable with either single keystrokes or complex macros (more than 400 in all). Programming the throttle isn't complicated—a DOS interface is included—but be prepared to spend some quality time before getting airborne.

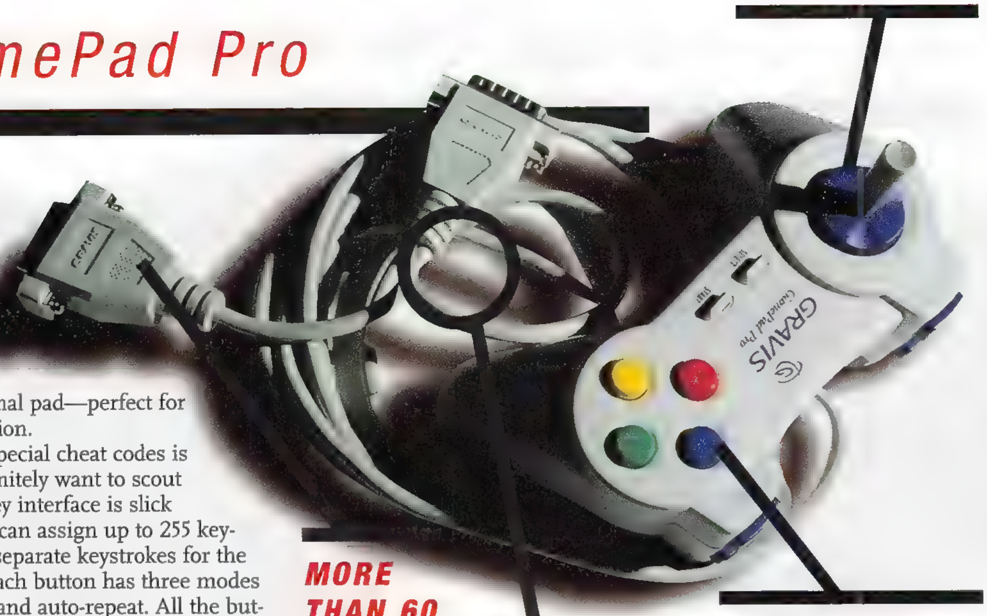
The Pro Throttle supports dual throttle modes—analog and digital—and is compatible with any DOS- and Win95-based game that supports a keyboard and joystick. Although it's never a good idea to mix programmable peripherals from different companies, the Pro Throttle works with third-party joysticks, even nonprogrammable ones.

product info

Price $109
Company CH Products
Phone 800.624.5804
URL www.chproducts.com


CH PRODUCTS
FOUR, 4-WAY HAT SWITCHES; FOUR FIRE BUTTONS—FULLY PROGRAMMABLE

Dominator GamePad Pro


MINI-JOYSTICK HANDLE
MORE THAN 60 GAME-CONTROL SETTINGS
CONNECT TWO PADS AT ONCE
10 PROGRAMMABLE BUTTONS: SIX ON TOP, FOUR TRIGGERS AT THE BACK
GRAVIS
GamePad Pro

It may look and feel like a PlayStation pad, but the GamePad Pro is the PC-equivalent of Gretsky, Bonds, and Rodman rolled into one. It's fully digital, super-programmable, and wickedly precise. Better still, each GamePad Pro comes equipped with a special adapter, allowing you to connect an additional pad—perfect for team play, or multiplayer competition.

If programming macros and special cheat codes is the name of your game, you'll definitely want to scout out the GamePad Pro. The GrIPKey interface is slick and exceptionally easy to use. You can assign up to 255 keystrokes to each button and assign separate keystrokes for the button press and button release. Each button has three modes of operation, including step, loop, and auto-repeat. All the buttons have sufficient tactility and just the right amount of play.

Control settings can even be printed for visual reference. Best of all, the GamePad Pro works in DOS. And to top it off, it's compatible with every GrIP-supported game, including the sports lines from EA Sports, Accolade, and Acclaim.

product info

Price $30
Company Gravis
Phone 800.663.8558
URL www.gravis.com

Fighting Game Ass Kicker Power Ramp

From a technical perspective, the PowerRamp isn't a game controller—it's actually a keyboard substitute that just happens to look and play like an arcade-level joystick. But if you're looking for the perfect ammunition to perform head-decapitating, bone-crushing moves in games such as *Virtua Fighter*, the PowerRamp is the only one up to the task.

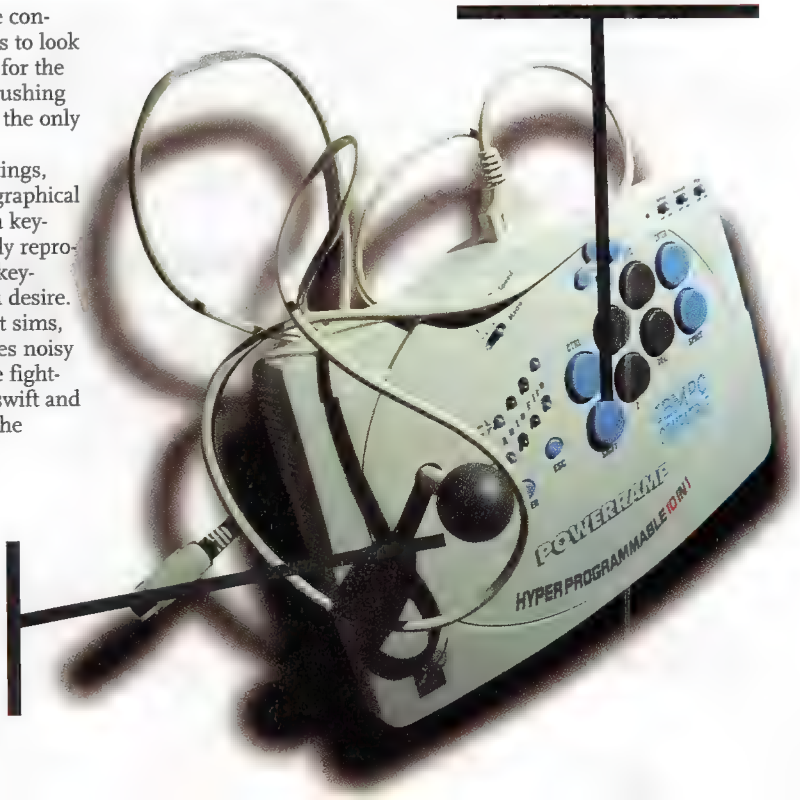
The PowerRamp ships with preconfigured control settings, which can then be loaded into memory through a Win95 graphical user interface. But because the PowerRamp is essentially a keyboard (a pass-through connector is included), you can easily reprogram every button (up to 10 characters each) for whatever keystroke combination, cheat code, or special attack move you desire.

Unlike traditional analog joysticks geared toward flight sims, the PowerRamp doesn't use potentiometers. Instead, it uses noisy microswitches, which are more perfectly suited for intense fighting games and action arcade shoot 'em-ups. Gameplay is swift and furious—if you're a quick draw, don't be surprised when the PowerRamp keeps up.

Question is, how long can *you* keep it up?

product info

Price $60
Company ACT Laboratory
Phone 800.980.9997
URL www.actlab.com


BUTTONS INCLUDE AUTO-FIRE, SPEED SELECTORS, AND MACRO KEYS
ARCADE-STURDY JOYSTICK
POWERRAMP
HYPERPROGRAMMABLE 10 IN 1

bootWORTHY

*They're **hot**, they're **sexy**, and they're waiting for a strong pair of hands like yours. The only problem is **they're not available.** So sit down, shut up, and **hold-on tight** while **boot** takes you on a **tour** of this year's **newest** and **coolest controllers**.*

X36 Flight Control System

Named after NASA's tail-less experimental fighter aircraft, the X36 Flight Control System comprises two components, a programmable control stick and a throttle/rudder control. Best of all, the complete system will retail for about $150, which is far less than competing products.

The metal-composite X36 stick features the ubiquitous ergonomically designed handle and is equipped with a wrist rest and microswitch trigger. There are also two eight-way hats, three fire buttons, x- and y-axis trim controls, and a nifty launch button. As if that isn't enough, a pinkie slide switch is positioned directly underneath the trigger, perfectly suited for squeezing off a few rounds.

Combined with the X35T throttle control—which is also fully programmable—you'll be large and in charge of more than 250 gaming functions. The throttle incorporates two rotary dials—useful for selecting weapons and radar modes, four detent positions, one four-way hat switch, and a three-position mode switch—perfect for assigning multiple game configurations. The system will ship with many predefined control sets and a snappy Win95 programming interface.

Available Mid-July
Price Less than $150
Company Saitek Industries
Phone 800.458.4377
URL www.saitek.plc.uk

SideWinder Force Feedback Pro

CH Products paved the way for sticks with tricks, and now Microsoft's releasing a force-feedback version of its hugely popular Win95-only digital SideWinder joystick.

This latest incarnation looks and feels drastically different from its predecessor. The 3-degrees-of-freedom handle has been ergonomically redesigned and the stick features a bevy of buttons, including a trigger, eight fire buttons, and a rotary dial throttle. There's also a small built-in fan keeping the components—including a single-circuit board and motors—cool.

Unlike other force-feedback controllers that require a game port and serial port, the Force Feedback Pro needs only a free game port, so installation is a snap. An onboard microprocessor provides smooth control, while the onboard ROM (and 32 built-in effects) helps offload complex effects algorithms from the CPU, for faster, effects-laden gameplay.

Microsoft has created the Visual Force Factory graphical-editing application for quick creation and easy manipulation of specialized force-feedback effects. The SDK includes a library of more than 100 preconstructed optimized effects. Hopefully Microsoft will opt to create a consumer-level editor as well.

Available Late fall
Price Less than $150
Company Microsoft
Phone 800.426.9400
URL www.microsoft.com

Millennium 3D Inceptor

The Millennium 3D Inceptor is based on a rotational hand controller used onboard the Space Shuttle for practicing manual shuttle landings, so it's no surprise that this baby looks mighty interesting.

The Millennium features left and right roll and twist movement on all three axes, but instead of moving the handle up or down (affecting a traditional gimbal/potentiometer system inside the base), the Millennium's grip pivots around the center of your hand as you move, providing for a unique and visceral gaming experience.

The controller also features a digital communication protocol supporting up to four players simultaneously, six fire buttons including a single stage trigger, and one four-way hat switch. There's even a Win95 programming interface to customize the stick and button functions.

Available Late July
Price Less than $80
Company ThrustMaster
Phone 503.615.3200
URL www.thrustmaster.com

CyberImpact Flight Yoke

PC flight jocks will be ecstatic to learn of this new flight controller. The CyberImpact Flight Yoke provides force-feedback effects along 2 degrees of freedom—one linear, one rotational—for accurate kinematics and feel in games and flight sims. The yoke also features three fire buttons, a rocker button, and an analog throttle control.

CyberImpact's API supports simple force-feedback effects such as recoil and plane collisions (presumably with land or other aircraft) and more advanced effects including flat tires, road textures, and vehicle balance. The API supports an unlimited number of axes and allows layered effects, so developers (or consumers) can create bizarre and unreal sensations to make gameplay more exciting and compelling.

Available Late August
Price Less than $200
Company CyberImpact
Phone 313.668.2567
URL www.cybernet.com

PREVIEWS

HARDWARE ON THE HORIZON AND **SOFTWARE** SOON TO SHIP

Communicator vs. Internet Explorer 66
S3 Plato/PX 68
Lands of Lore: Guardians of Destiny 69
Compaq Falt Panel Monitor 70
Card Bus Technology 70
Flying Nightmares 2 71

The boot ***Tracking Sheet***

TITLE	DEVELOPER	DATE
Dark Earth	*Kalisto*	*7/97*
Dungeon Keeper	*Bullfrog*	*7/97*
X-COM: Apocalypse	*Spectrum HoloByte/ MicroProse*	*7/97*
688i Hunter Killer	*Jane's*	*7/97*
Armored Fist	*NovaLogic*	*7/97*
Descent To Undermountain	*Interplay*	*7/97*
Flying Nightmares 2	*Eidos*	*7/97*
Outpost 2	*Sierra*	*7/97*
Swiv3D: Quad Assault	*Interplay*	*7/97*
Hexen II	*Activision*	*8/97*
StarCraft	*Blizzard*	*8/97*
Pax Imperia: Imminent Domain	*THQ*	*8/97*
Hardball 6	*Accolade*	*8/97*
Deathtrap Dungeon	*Eidos*	*8/97*
Major League Soccer	*Z-Axis/BMG Interactive*	*8/97*
Intel 440LX PCIset	*Intel*	*9/97*
Zork: Grand Inquisitor	*Activision*	*9/97*
VR Baseball 97	*Interplay*	*9/97*
Lose Your Marbles	*SegaSoft*	*9/97*
Dominion	*7th Level*	*9/97*
Flying Saucer	*Postlinear/Any River*	*9/97*
Battle Isle 4	*Blue Byte*	*9/97*
Crusader III	*Origin*	*9/97*
Lands of Lore II	*Westwood*	*9/97*
NetStorm	*Activision*	*9/97*
Riven	*Broderbund*	*9/97*
Defiance	*Avalon Hill*	*10/97*
Screaming Demons	*Activision*	*10/97*
Sub Culture	*Criterion/Virgin*	*10/97*
Myth	*Bungie*	*10/97*
SandWarriors	*Interplay*	*10/97*
Grand Prix Legends	*Papyrus*	*10/97*
M.A.X. 2	*Interplay*	*11/97*
Blade Runner	*Westwood*	*11/97*
Unreal	*Epic MegaGames*	*11/97*
Demon Isle	*Sierra*	*11/97*
Kings Quest: Mask of Eternity	*Sierra*	*11/97*
10th Planet	*Bethesda*	*12/97*
Anachronox	*Eidos*	*12/97*
Daikatana	*Eidos*	*12/97*
Heavy Gear	*Activision*	*12/97*
The Dark Project	*Looking Glass*	*12/97*
Ultima IX	*Origin*	*12/97*
Guardians: Agents of Justice	*MicroProse*	*12/97*
Falcon 4.0	*MicroProse*	*12/97*
Quake II	*id*	*12/97*
European Air War	*MicroProse*	*12/97*
Populous: The Third Coming	*Bullfrog*	*12/97*
WarCraft Adventures: Lord of the Clans	*Blizzard*	*12/97*
G-Police	*Psygnosis*	*12/97*
Lunatik	*Pure Entertainment/ Psygnosis*	*12/97*
Respect Inc.	*Pure Entertainment/ Psygnosis*	*12/97*
3D Baseball	*Microsoft*	*12/97*
Prey	*3D Realms*	*Q1/98*
Sin	*Activision*	*Q1/98*
Star Trek: First Contact	*MicroProse*	*Q1/98*
MechCommander	*MicroProse*	*Q1/98*
Windows 98/Memphis	*Microsoft*	*Q1/98*
MMX 2	*Intel*	*Q1/98*
The Gatherer	*7th Level*	*Q1/98*
Windows NT 5.0	*Microsoft*	*Q2/98*
MechWarrior 3	*FASA*	*Q2/98*
Duke Nukem Forever	*3D Realms*	*Q2/98*

These dates are subject to change

Browser **War '97**

Getting pushy with new versions

Ah, perpetual browser betadom. You know it well. Install final code on your veritable halfway house of a hard drive and new betas that promise to redefine your online M.O. spring up. So you give in and cruise into cyberspace with a cheap Saturday-night special. Sure, beta software can be unstable, but who can resist the thrill of the 50-minute download? Besides, those browser development teams are so damn frisky. Give 'em enough resources and they'll build you a whole new paradigm.

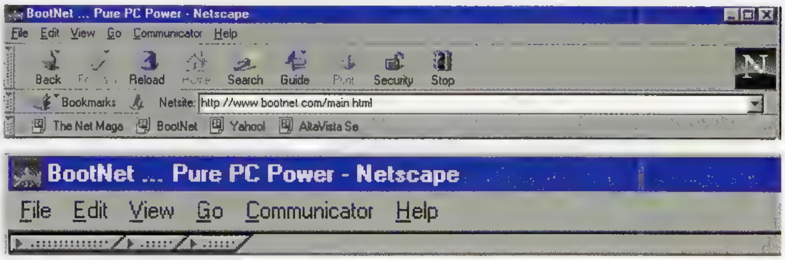
The fourth-generation versions of Navigator *and* Internet Explorer *are not even browsers per se.* Navigator *is now just one of many components in a groupware buffet called* Communicator*, which Netscape says will be final by the time you read this.* IE*, which should be ready sometime this summer, has been dramatically revamped, too. Instead of beefing up separate "productivity" apps for use in corporate nation-states, Microsoft focused its energy on "true web integration"—meshing the browser with the desktop.*

For people seeking the ultimate web client, both products offer new interfaces, offline browsing, and support for divergent specs of "dynamic HTML." Each spec is essentially an object model that uses HTML, style sheets, and a scripting language to create precise layouts and interactive multimedia. This means Shockwave-like content that downloads quickly in the form of thin HTML objects.

Netscape's spec is based on JavaScript, Cascading Style Sheets (CSS), and JavaScript-Accessible Style Sheets (JASS) and, to an ever-diminishing extent, the proprietary Netscape Layers tag (neither the Layers tag nor JASS has been approved by the World Wide Web Consortium). Microsoft's spec also uses JavaScript but is open to other scripting languages (such as VBScript), and forgoes JASS entirely for CSS. Both companies' specs can employ Java for extended gimmickry, and, of course, Microsoft's spec also employs ActiveX. Unfortunately, the two object models don't always play nice-nice in the other's browser, so content providers may ignore dynamic HTML until one spec becomes a ratified standard or, design for two platforms.

Dynamic HTML aside, all net surfers will be able to enjoy both browsers' ersatz Push features. We're not talking real Push, à la PointCast, where a content provider sends a steady stream of files without provocation on your part. Instead, Navigator*'s and* IE*'s models depend on scheduled requests: Pick a content channel, then tell your browser how often to pull updates. It's simple, but seems magical when breaking news appears on your desktop.*

Here's the scoop on Netscape Communicator Preview Release 4, *and a late alpha of Microsoft* Internet Explorer 4.0.


BootNet ... Pure PC Power - Netscape
File Edit View Go Communicator Help
Back
Reload
Home
Search
Guide
Print
Security
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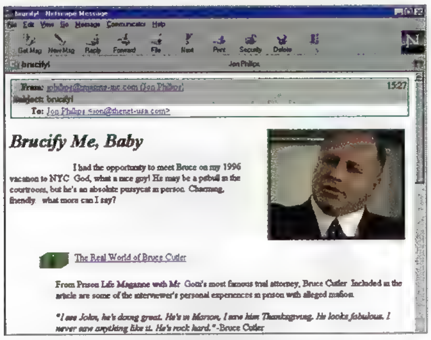
The Net Mags
BootNet
Yahoo!
AltaVista Se
BootNet ... Pure PC Power - Netscape
File Edit View Go Communicator Help

Top: Fully expanded, *Navigator*'s toolbars offer buttons for bookmarks and your most frequently visited web sites. Bottom: Fully collapsed, the toolbars save more than an inch of screen space.

Netscape **Communicator**

Since most Internet activity occurs in browser windows—who FTPs from a separate client anymore?—don't discount the value of a better browser interface. Dig the new *Navigator*:

- Collapsible toolbars free up to 1$^1/_8$ inches of screen with three clicks.
- A new Personal toolbar with quick-access buttons for favorite bookmarks.
- Single-button access to all the major search engines.
- A nifty Quickfile button lets you drag URLs into any compatible document—your bookmark editor, a mail message, another HTML document, a text file, anything.


brucify! - Netscape Message
File Edit View Go Message Communicator Help
Get Msg
New Msg
Reply
Forward
File
Next
Print
Security
Delete
N
brucify!
Jon Philips
15:27

Subject: brucify!

Brucify Me, Baby

I had the opportunity to meet Bruce on my 1996 vacation to NYC. God, what a nice guy! He may be a pitbull in the courtroom, but he's an absolute pussycat in person. Charming, friendly... what more can I say?

The Real World of Bruce Cutler

From Prison Life Magazine with Mr. Gotti's most famous trial attorney, Bruce Cutler. Included in the article are some of the interviewer's personal experiences in prison with alleged mafiosi.

"I see John, he's doing great. He's in Marion, I saw him Thanksgiving. He looks fabulous. I never saw anything like it. He's rock hard." -Bruce Cutler

Netscape *Messenger* supports almost all of HTML 3.2 directly in e-mail.

▮ Back and Forward buttons that list navigation history (the Location window now provides the same history list).

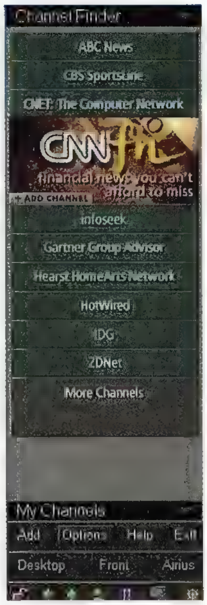
As for content support, Netscape's version of dynamic HTML is strong enough to create PointCast-like pages replete with sliding panes and interactive mouseovers (Microsoft's dynamic HTML demos, however, were much more compelling than Netscape's demos when played with betas of both browsers in May.) Expect to see the most compelling use of *Navigator*'s dynamic HTML in premium Netcaster channels (Netcaster is Netscape's faky new Push component). Channels can appear in your browser window, and in full-screen Webtops, which run on your desktop as you go about your regular business.

Any site can become a Netcaster channel; after all, your browser is simply pulling packets from a run-of-the-mill HTTP server. In the long run, however, most users will probably limit their channel subscriptions to sites that provide continuously updated, dynamic HTML content. When final *Communicator* code is released, look for premium channels from ABCNews, HotWired, and CNN's Financial Network.

Communicator is also a groupware suite. When you launch any *Communicator* component, a little floating toolbar gives you one-button access to all the major clients: *Navigator*, Netcaster, *Messenger* (the mailer), *Collabra* (the discussion/Usenet reader), and Composer (a rudimentary HTML editor).

We'll skip *Communicator*'s more mundane features and sing the joys of *Messenger*: it supports HTML almost as well as any web browser. This means you can send and receive full web pages (except for Frames) in the body of an e-mail message. The mail client also offers a full menu of power features—filtering, address books, spell check, LDAP directory support—so you can finally uninstall your separate mailer, and go with a single Internet client.

If you dig the Netscape vision, download *Communicator* and ditch *Navigator 3.0*. You won't want to miss scheduled requests for baseball scores, and e-mail messages with rich HTML.


Channel Finder
ABC News
CBS SportsLine
CNET: The Computer Network
CNNfn
financial news you can't afford to miss
+ ADD CHANNEL
infoseek
Gartner Group Advisor
Hearst HomeArts Network
HotWired
IDG
ZDNet
More Channels
My Channels
Add
Options
Help
Exit
Desktop
Front
Airius

***Communicator*'s Channel Finder provides scheduled requests of premium, dynamic HTML content.**

product info

Product ***Communicator***
Available ***June 97***
Price ***$59 standard; $79 professional***
Company ***Netscape***
Phone ***800.638.7483***
URL ***www.netscape.com***

Microsoft **Internet Explorer 4.0**

Sure, we've all heard that Microsoft will give the next version of Windows a browser-like interface, but we've never seen the ambitious little scheme in action. Well, here's the grand unveiling. Microsoft's Paul Balle says, "*IE 4.0* with web integration is the default interface that you'll install when you install Memphis, and, guess what, it's available today."

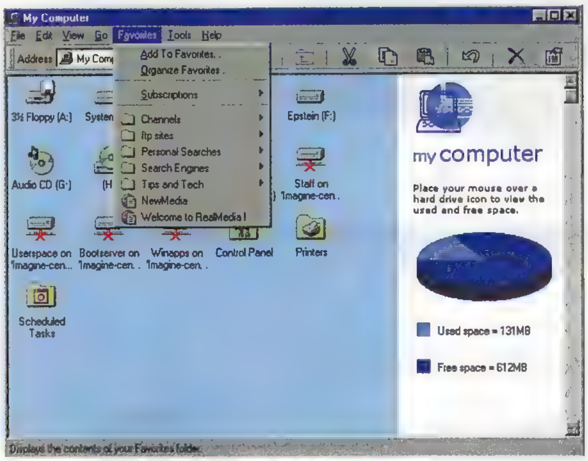
So, how far can you wedge a round browser into a square desktop? Witness "true web integration":

▮ Every desktop icon boasts a hypertext underline and can be launched with a single click.
▮ Folders can be elaborately formatted HTML pages.
▮ Back and Forward buttons in every folder menu streamline local directory navigation.
▮ Folder menus' Favorites option immediately accesses preferred web sites and items on your local hard drive. The goal is to create an environment where files are files and directory paths are directory paths, positions on the Internet or your computer notwithstanding.
▮ The web is everywhere: The splash screens of all your Favorites can also appear in a clickable, rotating screensaver.

And here's a nice little touch: The My Computer folder now boasts a pie chart indicating available space in all attached drives and servers.

Microsoft's "Push" model is best demonstrated by its Active Desktop components. Simply go to the web site of a content provider, download its custom-designed component, and select how often you'd like updates (the default is once daily, but you can set it for every 15 minutes). Now you have a little ticker on your desktop that spits out sports scores, weather reports, and stock quotes.

The Active Desktop component is just one manifestation of *IE*'s scheduled-request mechanism. In fact, you can subscribe to any web site, telling your browser how often to pull updates, how much content should be downloaded (that is, how many pages deep, how many K of material, etc.), and how you should be notified of updates (via e-mail or a gleaming light on your Favorites menu or taskbar).


My Computer
File Edit View Go Favorites Tools Help
Address
My Computer
Add To Favorites...
Organize Favorites...
Subscriptions
Channels
ftp sites
Personal Searches
Search Engines
Tips and Tech
NewMedia
Welcome to RealMedia!
3½ Floppy (A:)
System
Epstein (F:)
Audio CD (G:)
Staff on 'Imagine-cen...
Userspace on 'Imagine-cen...
Bootserver on 'Imagine-cen...
Winapps on 'Imagine-cen...
Control Panel
Printers
Scheduled Tasks
my computer
Used space = 131MB
Free space = 612MB

Place your mouse over a hard drive icon to view the used and free space.

Displays the contents of your Favorites folder.

***Explorer*'s web integration brings Favourites to all desktop folders.**

As for basic browser additions, the new version of *IE*, like *Communicator*, comes packed with more new features than can be described in a 62-page white paper. So let's end by saying Microsoft has addressed two small, but nagging, shortcomings: The browser is now 100% JavaScript compatible, and it finally has an auto-complete feature so you don't have to type URLs in full—"bootnet" followed by ctrl-enter will send you directly to our web site.

— Jon Phillips

product info

Product ***Internet Explorer***
Available ***Summer 97***
Price ***Free***
Company ***Microsoft***
Phone ***800.426.9400***
URL ***www.microsoft.com***

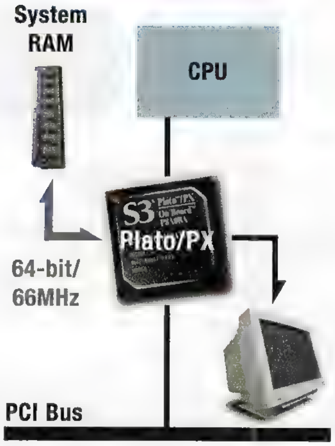
S3 Plato/PX

Multimedia assassin

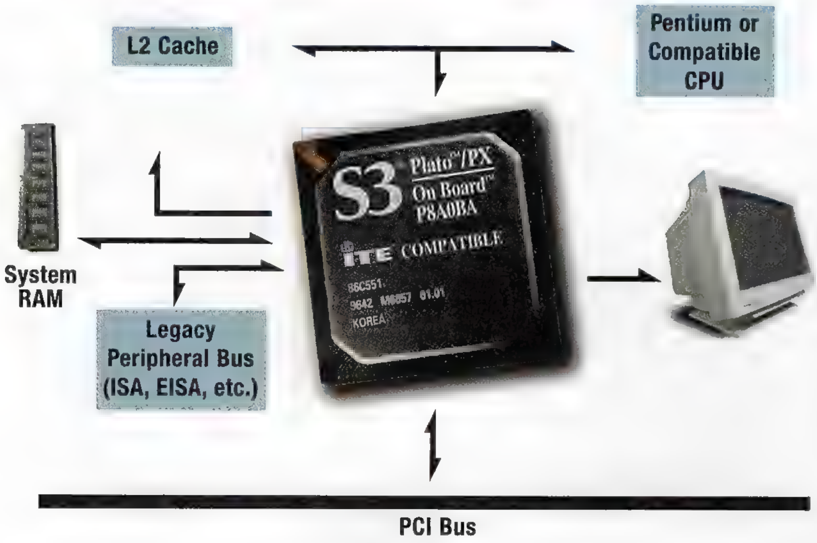
These days there's intense competition among desktop PC manufacturers to knock off the low-end market. WebTV missed the mark, and Microsoft picked up that contract. Cyrix will take its shot with MediaGX's (previewed in *boot* 09) multifunction CPU/video card/PCIset combo a-blazing. Now S3 is providing ammunition with its Plato/PX Integrated Platform Accelerator.

S3's $30 OEM part is a synergy of its Trio64V+ 64-bit graphic chipset and its very own PCIset, and targets the sub-$1,000 PC. Unlike the MediaGX, the Plato/PX leaves the CPU out of the equation.

The 388-pin BGA (Ball Grid Arrayed) Plato/PX's video portion uses system RAM for frame buffering, requiring a minimum of 8MB total memory, holding up to 4MB of system memory hostage for video, depending on resolution and color depth. Maximum resolutions will be 1280x1024 at 8-bit, 1024x768 at 16-bit, and 800x600 at 24-bit. Plato will control memory dynamically, and S3 promises allocation will be transparent, without performance hits. Plato's graphic performance should be dramatically increased because the chip will run on the processor bus rather than going through the PCI bus, so video will scream at 66MHz rather than the 33MHz PCI-bus limit. Only SiS is working on a similar video subsystem/system controller solution.

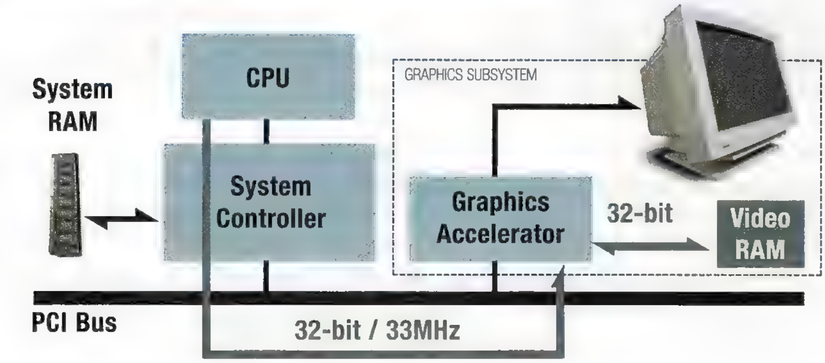


At 66MHz, the Plato/PX's close-coupling to the CPU and memory subsystem should prove a formidable, cost-effective solution.



The Plato/PX bypasses the PCI bus, providing faster video processing.

L2 Cache
Pentium or Compatible CPU
S3 Plato™/PX On Board™ P8A0BA
ITE COMPATIBLE
86C551
9642 M6057 01.01
KOREA
System RAM
Legacy Peripheral Bus (ISA, EISA, etc.)
PCI Bus



Current systems are hampered by the 33MHz PCI bus.

S3's Stream Processor technology will support real-time stretching and blending of a primary RGB stream and a secondary RGB or YUV/YCbCr (video) stream. Load in hardware double-buffering and a slew of multimedia tactics, such as sprite-plane support, chroma-keying, and video acceleration for Indeo, Cinepak, and software-accelerated MPEG-1, and you have cost-effective video with real impact.

The PCIset claims full Intel compatibility and comes with an impressive arsenal. System RAM will top out at a 430TX-crushing 320MB RAM (SIMM or DIMM, and all can be cached), and it will handle a whopping 2MB of L2 cache.

All Pentium-based processors (including MMX), as well as AMD and Cyrix, are fair prey, so motherboard manufacturers will have even more reasons to integrate Plato/PX into upcoming boards. And because the Trio64V+ is a tried-and-true design with device drivers galore, system integration will be a snap.

S3 won't disclose which companies plan to use the Plato/PX, but they assure us that major system vendors and motherboard manufacturers are seriously looking into the hybrid's possibilities.

It remains to be seen whether S3 can take Plato from the entry-level market into the mainstream where all the systems can take advantage of the 66MHz video bus.

— *Andrew Sanchez*

product info

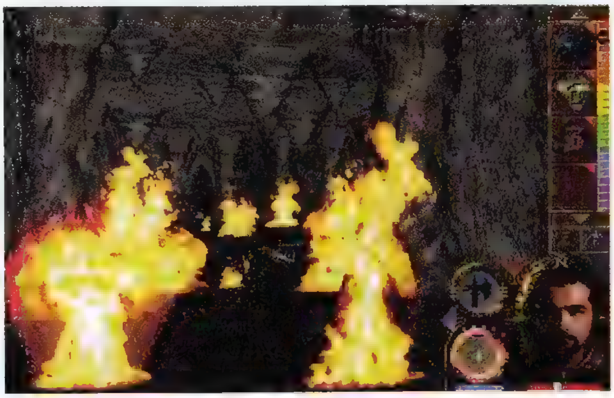
Available ***Aug 97***
(in systems)
Price ***$30 (quantity of 10,000)***
Company ***S3***
Phone ***408.588.8000***
URL ***www.s3.com***

Lands of Lore: Guardians of Destiny

Slay in SVGA

Westwood Studios hopes to breath new life into the comatose PC RPG market with Lands of Lore: Guardians of Destiny, *featuring a new, free-moving 3D graphics engine and tons of adventuring.*

***Louis J. Castle**, Westwood's vice president of creative development, gives us the inside track on this upcoming epic.*



Fire is the least of your worries in *Guardians of Destiny*. You should be more concerned about the three dozen kinds of evil beasties.

Dark caverns harbor great treasures... and danger.

Hordes of undead monstrosities will harass you.

Highly animated sprites make beasties come alive.

boot: Is *Guardians* a "real" RPG or an action-oriented game with RPG elements?

Castle: *Guardians* is a real RPG, with some action-oriented elements. It's heavily story-based and rich in worlds to explore.

boot: How much character-building is there?

Castle: Your actions determine character development. This reaches beyond simple statistics and into the realm of the soul.

boot: What quests will there be?

Castle: In pursuit of your cure, you explore the mysteries of ancient magic and numerous mystical races and cultures, enlisting the aid of others through persuasion or threat of violence.

boot: How many characters can join your party?

Castle: You are a lone adventurer.

boot: Are we talking linear storyline?

Castle: Only in the sense of your goal. There are many means to your end.

boot: Is Westwood hiring any big-name actors to do the voice-overs, à la Patrick Stewart in the original?

Castle: We've hired many recognized actors for *Guardians*, including Julie Newmar (Catwoman from *Batman*) and Vincent Schiavelli (*Ghost*, *The People vs. Larry Flynt*).

boot: Tell us about *Guardians*' 3D engine.

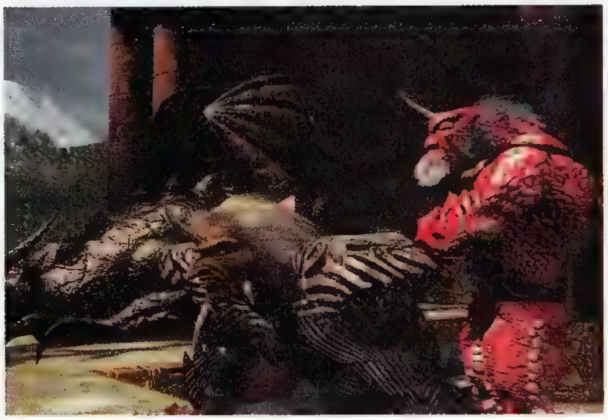
Castle: The high-res, polygon-based engine features true dynamic lighting, MIP mapping, and dynamic geometry never seen before in a competing product. These features are available without hardware assistance. But most important is the quality, variety, and depth of *Guardians*' worlds. You can explore for hours in jungles, glaciers, caves, ancient ruins, underwater cities, and more, and never feel like you've been to the same place twice.

boot: What cool visual effects can we expect? Perspective shadowing? Radiosity colored lighting? Reflective surfaces? Semi-translucent waters?

Castle: We've simulated many of these effects, but they're not "real" features of our engine.

boot: How many frames of animation will the monsters have? How many pixels will a typical beast be?

Castle: There's no inherent limitation to the number of frames a creature may have. Many of the monsters have thousands of frames of animation, and each frame can be as large as 256x256 source pixels. Played back-to-back you could watch the graphics for more than four hours without repeating a single frame, not including exploring the 3D graphics engine.



Unleash your magical energies and rip some medieval orifices in Westwood Studios' *Lands of Lore: Guardians of Destiny*.

boot: What kind of lurking horrors can we expect? How many?

Castle: *Guardians* has more than three dozen types of creatures and each is unique, with its own agenda. Each "type" can be considered a race of creature with individuals deviating from the basic archetype.

boot: How will combat and spell-casting be handled in *Guardians*?

Castle: Point-and-click, with hundreds of items to use as weapons, dozens of magical combat effects from those items, and over 30 spells.

boot: When first seen at E3, *Guardians of Destiny* was 320x200 VGA. With the advent of 3D accelerators and MMX, will SVGA be an option? What about 3D accelerated/enhanced versions?

Castle: We'll support MMX, and our software-only engine runs in high-res SVGA in DOS and Windows. So far, we haven't found much improvement in 3D accelerators, but we expect to support at least one chipset.

boot: What frame rates can we expect?

Castle: We sustain more than 15fps on a Pentium 90. The game's playable on a 486/66 in low res, but the frame rate suffers.

boot: Will there be multiplayer?

Castle: *Guardians* is a hero's quest. No multiplayer support exists for this product, but stay tuned.

boot: Does Westwood plan a DVD version?

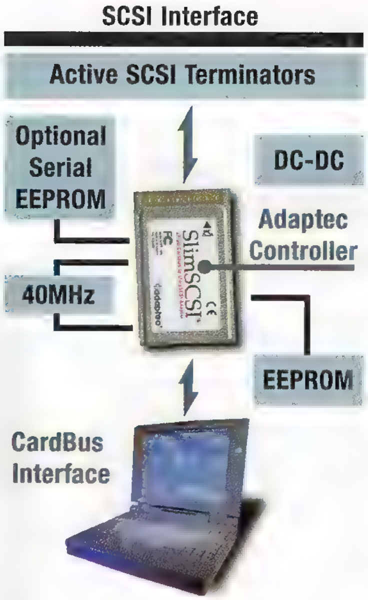
Castle: We're looking into DVD, but no deals have been announced. Our internal video compression is better than MPEG—and you can be the judge of the quality.

product info

Available *August 97*
Price *TBA*
Developer *Westwood Studios*
Publisher *TBA*
Phone *800.874.4607*
URL *www.westwood.com*

Card**Bus** Technology

Deal yourself in



According to a Dataquest report, more than 2 million CardBus-compatible notebooks should have shipped by the end of 1996. But the next evolution of add-in card standards for mobile PCs missed the bus, with only a handful of supported products being released during 1996. Now another analyst, IDC, estimates that approximately half the notebooks shipping this year will include CardBus support.

So, what is CardBus?

Defined by the PCMCIA Association in 1995, CardBus is a high-performance, 32-bit bus that supplants the older 16-bit PC Card standard (formerly known as PCMCIA). It improves notebook and device performance, reduces power consumption, and, more importantly, increases the overall versatility of mobile PCs.

To this end, CardBus combines the best features of PC Card technology (including legacy support, lightweight design, low power consumption, and hot-plugging capability) with a 32-bit PCI bus running at 33MHz (approximately 20 times faster than a PC Card). This translates into a 132MB/sec data throughput rate, equivalent to desktop PCI performance. Bus mastering is also supported, and because control is offloaded to an onboard microprocessor, CPU utilization drops some 70%, freeing system resources for multitasking applications.

CardBus devices must run on 3.3V or lower, reducing system power requirements and extending battery life. If the device doesn't adhere to these low-voltage requirements, it is rejected and ejected.

But according to Shawna Morgan, product manager for Adaptec (which will soon be releasing its APA-1480 CardBus to SCSI Adapter), three things guarantee true CardBus compatibility: the notebook must have a CardBus expansion slot that will accept both CardBus and PC Card devices, the system BIOS must recognize CardBus as a slot option, and the notebook must be running Win95 OSR/2. Anything less, and your notebook isn't bona fide CardBus-compatible.

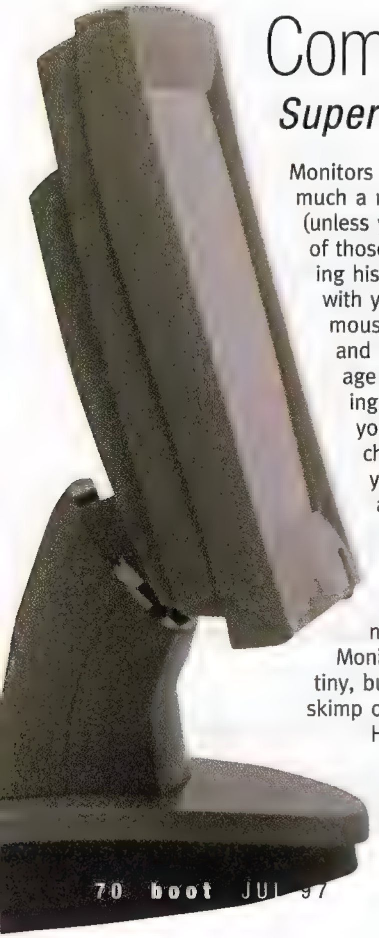
— *Bryan Del Rizzo*

product info

Available **Late summer**
Price **$199**
Company **Adaptec**
Phone **800.442.7274**
URL **www.adaptec.com**

Compaq **Flat Panel** Monitor

Super thin and super cool



Monitors are pretty much a necessity (unless you're one of those idiots wearing his PC). And with your joystick, mouse, modem, and portable storage device fighting for room on your desktop, chances are you'd welcome any opportunity to reclaim some of that space. Well, Compaq's new Flat Panel Monitor may be tiny, but it doesn't skimp on features.

Housed in a super-compact, lightweight case, the 15.1-inch display area (optimized for 1024x768 at 75Hz to support flicker-free images) is only slightly smaller than a traditional 17-inch CRT. Dimensions are sweet—this baby measures just 15 inches wide and 2.8 inches deep—and weighs less than 20 pounds.

Unlike other flat-panel displays, Compaq's model doesn't require a special graphics card, plugging directly into any standard VGA port. The viewing angle can be adjusted by tilting the monitor 35 degrees up and 5 degrees down, and Compaq claims the off-axis viewing angle will surpass 120 degrees.

The display can be mounted three ways: using a standard monitor base, hanging on a wall, or using a desk arm mount that can be angled and adjusted to enable versatile use of your desk space. The total installation area needed for the monitor and base is only 42 inches square, whereas a regular CRT could easily consume 295 square inches. The base also includes a built-in Universal Serial Bus hub to connect and daisy-chain up to 127 USB devices such as game pads, keyboards, and mice.

According to Compaq, this lean, mean contender consumes 65% less power than a traditional CRT.

The on-screen display adjustments will feature more than 15 settings, including multiple language selections, vertical and horizontal positioning, and power-saving modes. The display also meets strict environmental standards and features "Intelligent Manageability," including Plug-and-Play compatibility and Asset Control, providing on-screen information including model number, serial number, and supported resolution modes.

— *Bryan Del Rizzo*

product info

Available **July 97**
Price **Less than $5,000**
Company **Compaq**
Phone **800.345.1518**
URL **www.compaq.com**

Flying **Nightmares 2**

The best of both worlds

Eidos is burning the midnight oil on Flying Nightmares 2*, a flight sim that'll make almost every hardware accelerator known to bootKind sweat till it's wet.*

Packing two flight models, the VTOL capabilities of the AV-8B Harrier 2+ and the nap-of-the-earth-hugging AH-1W Cobra helicopter, into one simulation without compromising either is a Herculean task. Producer ***Bryan Walker*** *lays down the law on what to expect from* FN2.

boot: Why did you showcase the Harrier jump jet and the Cobra helicopter in one game?

Walker: The U.S. Marines use both as dedicated close-air support platforms, each performing a unique and challenging role. We think players will enjoy the low-level action these aircraft specialize in much more than shooting targets at 50 kilometers while tooling around at 45,000 feet.

boot: How many missions will you be able to fly? Will there be two distinct campaigns, one for the Harrier and one for the Cobra?

Walker: *FN2*'s Cuban Campaign is optimized for single-player action, challenging you to master both the Harrier and the Cobra in a very dynamic series of missions [about 24] during a hypothetical military coup in Cuba. Some missions will be Harrier-specific, some Cobra-specific, while others require you to fly both aircraft in different sections of the same mission.

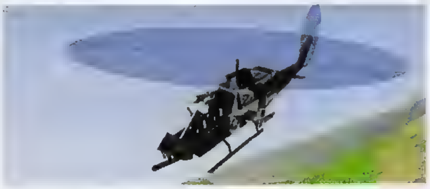
boot: What type of flight model do you plan to use for *FN2*?

Walker: *FN2* will offer three levels of flight model, each using a full 6 degrees-of-freedom force model. There will be an arcade, intermediate, and advanced toggle to challenge all skill levels. Other difficulty toggles include ammunition, crashes, and damage settings.

boot: What kind of 3D acceleration are you planning for *FN2*, and what performance improvements can we expect with those versions?

Walker: We plan to do specific ports for the Rendition Vérité V1000 and V2200 chipsets, the 3Dfx Voodoo and Voodoo Rush, ATI Rage Pro, ViRGE DX/GX, and Matrox Mystique. Other chipsets will be supported via Direct3D.

The biggest improvement the 3D accelerator provides is higher pixel and color resolutions. Combined with bilinear filtering, alpha blending, and multiple-source lighting effects, *FN2*'s graphics engine really shows what the new generation of accelerators can do. Once players see this game running on a 3D accelerator, they'll never settle for 8-bit color again.

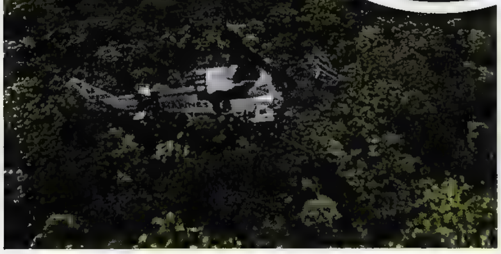


Flying Nightmares 2 **will meld the VTOL Harrier with the Cobra helicopter in one high-powered flight sim.**

boot: The graphics do look incredible. Is this a completely new game engine or are remnants of the original *FN* in there?

Walker: *FN2* is built on entirely new technology, so every facet has been drastically improved over the original. *FN2* offers unique challenges in the two very different aircraft. Developing terrain detailed enough to be believable from a Cobra at 50 feet and a Harrier at 25,000 feet has been an incredible challenge for our programmers and artists. All-new graphics routines had to be developed, and nothing in the original *FN* was brought over.

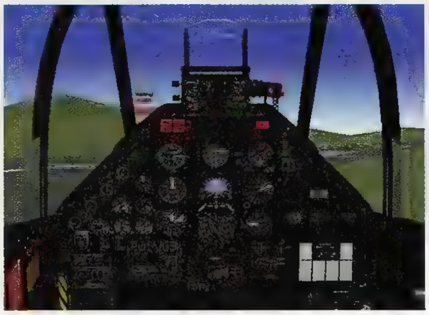
If you have the hardware, *FN2* will take advantage of it.



A Bell-Huey Cobra stalks its prey above the tree line.

boot: Will Eidos do a version of *FN2* that uses both MMX and 3D acceleration? How about a Pentium II–specific version?

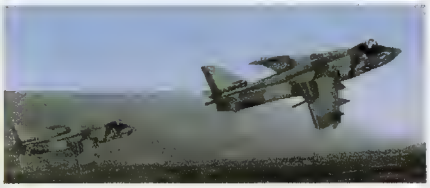
Walker: Absolutely. Combining MMX and 3D acceleration does provide some very significant performance gains and we're already coordinating with Intel to develop a Pentium II and AGP-optimized version of *FN2.*



It's a cramped view from the Harrier's cockpit, but the power's all yours.

boot: What visual tricks and effects can we expect from *FN2*'s game engine?

Walker: The *FN2* graphics engine can support 10 simultaneous light sources, so weapons effects will leave proper shadows, and different colors of lights can easily be reproduced. Seeing an artillery unit light up several hundred meters of terrain with a volley is very immersive viewing!



Twin Harriers go cruisin' for a bruisin' in this bilinear-filtered landscape.

boot: Any plans for support of force-feedback devices?

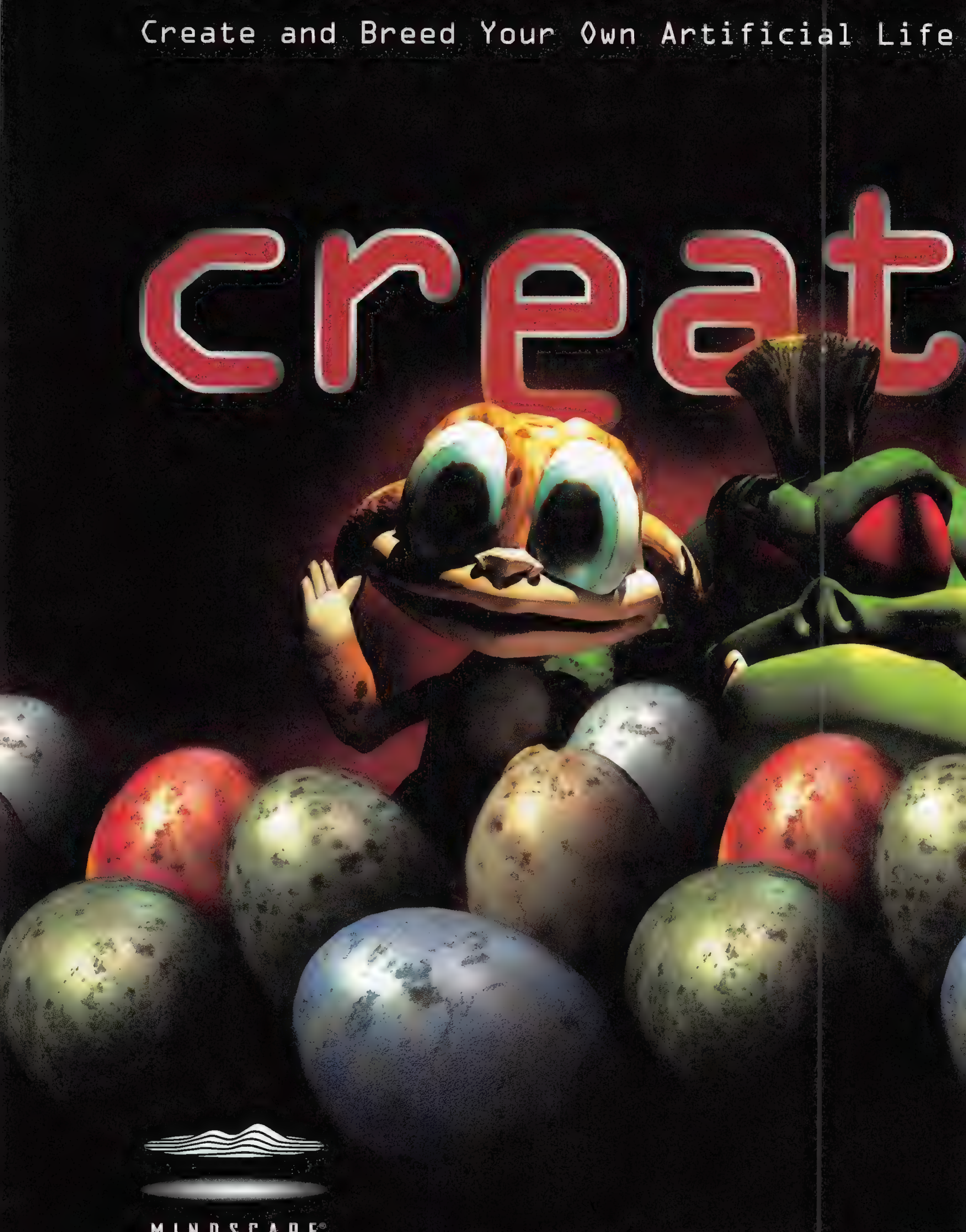
Walker: Absolutely. *FN2* players will be able to use the CH Products and Microsoft force-feedback sticks.

boot: Two different aircraft beg multiplayer capabilities. How will multiplayer be implemented?

Walker: *FN2*'s unique multiplayer, strategic game, Commandant, offers the first truly new idea in flight simulation this decade, allowing up to 16 players to divide in two teams and take part in a dynamic and immersive battle. With the ability to direct and support realistic ground forces while facing off against the aircraft of the "enemy" team, we feel Commandant offers the next step for fans of multiplayer flight simulation.

product info

Available *August 97*
Price *TBA*
Developer *Domark*
Publisher *Eidos*
Phone *415.616.2022*
URL *www.eidosinteractive.com*


Create and Breed Your Own Artificial Life
Creat
MINDSCAPE
ENTERTAINMENT

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> “Call it a game if you like, but this is the most impressive example of artificial life I have seen.”
>
> Richard Dawkins, Oxford University zoologist and author

ures™

> “I first saw this program in the same week that evidence was discovered of life on Mars. This is more exciting.”
>
> Douglas Adams, Author of Hitchhiker's Guide to the Galaxy

Coming This Fall

for Windows®95 and Macintosh® CD-ROM

mindscapegames.com

Product Information Number 238

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CyberLife™

KIDS TO ADULTS
TM
K-A
CONTENT RATED BY
ESRB

KICKIN' THE TIRES ON THE LATEST **HARDWARE** AND TAKIN' THE NEWEST **SOFTWARE** OUT FOR A SPIN

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Gateway 2000 G6-266M

P200 put-down power

The Pentium II revolution has begun, and if Gateway 2000's G6-266M is any indication of what the future holds, the P200 had better step aside.

Sporting the same Eurocentric mid-size tower as last month's Gateway P200 MMX machine, it's only when you crack the G6-266M's case that you realize this machine's potential. Intel's Portland ATX formfactor motherboard is the platform for Intel's 512K L2 cache-enhanced P-II 266MHz processor. Four SIMM slots limit your RAM urges to 256MB, despite the 440FX PCIset. The 64MB of EDO-DRAM that ship with the machine will tide you over until you want to upgrade.

The case offers sumptuous expansion possibilities with easy access to system components. When the time comes to add those cool new cards, the G6-266M gives you three PCI, two ISA, and the proverbial shared slot. Two precious PCI slots are already spoken for, and one ISA is filled with the TelePath X2 56Kbps fax/modem.

Ensoniq's AudioPCI 9712 sound card ladles luscious wavetable audio as well as full digital sound over the PCI bus, while STB's Nitro3D (reviewed in *boot* 10) with 4MB of EDO-DRAM handles the pixel pumping. If the Maxtor 85120 A8 5.12GB EIDE hard drive isn't enough for you, three 3.5-inch bays (two mounted vertically) and one 5.25-inch bay await more drives.

An Iomega Zip drive makes storing JPGs a helluva lot easier, and Mitsumi's FX104S CD-ROM drive handles the disc duties. The only unsightly byproduct of all this EIDE connectivity is the solitary channel left free.

Gateway 2000's owner's manuals offer a wealth of information, including user guides and technical reference manuals about every aspect of the system. An info-laden motherboard manual is chock-full of jumper configurations, BIOS settings, and meanings, and much more is standard.

The system ships with Win95 OSR/2, but manufacturers refuse to enable bus-mastering on their CD-ROM drives. This results in lower CPU utilization. Also, Gateway deserves a slap on the wrist for not using STB's Vision 95 drivers—and why aren't the real-mode DOS drivers configured correctly?

If you're looking for performance, the G6-266M starts some serious fires. The P-II 266MHz sent our bootMark through the roof, clocking in at a sizzling 126.7. (A typical P200 MMX does about 55—you do the math.) SYSmark32 scores are equally impressive, posting an all-time high of 280. Every subsystem performed above and beyond the call of duty, with the hard drive posting swift transfer rates and the ViRGE GX/P-II combo posting a sweet *MDK* performance score of 112. But just when we thought we were completely enraptured, VESA 2.0 gave a swift kick in the buttocks, forcing us to whip out *Display Doctor* for our *Quake* benchmarks, which scored a decent, but not overwhelming, 15fps. Once again, the cursed S3 ViRGE refused to run our Direct3D benchmark. Sigh. Thankfully, the C++ compile and *DeBabelizer* test rushed by at a frightening pace, clocking all-time low scores and assuaging doubts that the P-II's speed increase wouldn't make a difference.

ENSONIQ CARD With a little help from a DOS TSR, this card achieves the Sound Blaster compatibility it deserves, but it doesn't ship correctly configured.

Drop in a 3D accelerator and the G6-266M is one serious workhorse. At this rate, the P200 may be trampled by the P-II rush sooner than most think.

— *AndrewSanchez*

Windows NT 4.0 Not Spoken Here

Prepare to run into a major language barrier to enjoying heavenly NT 4.0 bliss on your Gateway system. Because of OSR/2's new FAT32 file structure, NT 4.0 refuses to install, claiming your hard drive is corrupted. In fact, it's just speaking a new file-structure language. You'll need a partitioning utility such as *Partition Magic* to convert FAT32 back to FAT16 before you start your NT 4.0 installation. Once you do, you're on your way to dual-boot bliss.

under the hood

THE BRAINS

CPU	Intel Pentium II 266MHz (single)
L2 Cache	512K PBRAM
RAM	64MB EDO-DRAM (256MB maximum)
Motherboard	Intel Portland ATX

THE BRAWN

Video Card	STB Nitro 3D w/4MB EDO-DRAM (S3 ViRGE GX)
Hard Drive	Maxtor Diamond Max 85120 AP 5.12GB EIDE
CD-ROM	Mitsumi FX104S 16x EIDE
Expansion Bus	Three PCI (two occupied); two ISA (one occupied); one PCI/ISA shared
Fax/Modem	TelePath X2 56Kbps
I/O Ports	Two USB; two serial; one parallel

THE BEAUTY

Display	Gateway CrystalScan YE0711-01 17-inch Trinitron monitor, 0.28 dot pitch, max res 1280x1024 @ 85Hz
Sound	Ensoniq AudioPCI 9712 wavetable/digital sound
Speakers	Altec Lansing ACS410 system w/Dolby Surround Sound and ACS251 subwoofer

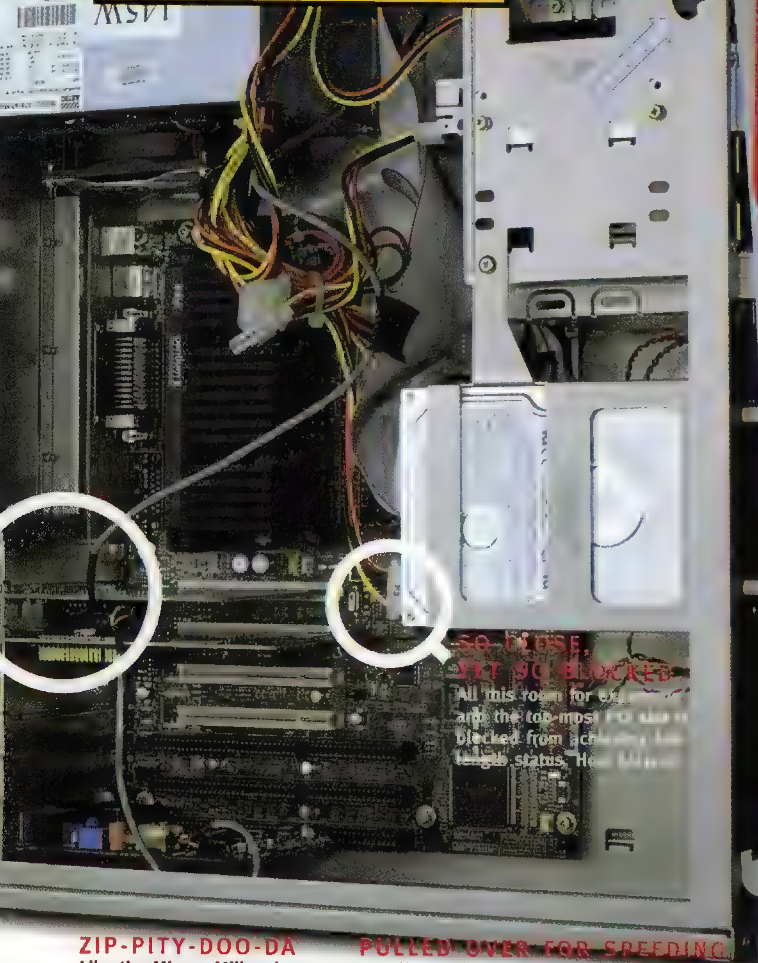
EXPANSION MAP

PCI	USB ports/blocked
PCI	Video card
PCI	Free
PCI	Free/shared
ISA	Free/shared
ISA	[illegible]
ISA	Modem

THE BUNDLE Windows 95 OSR/2 | Office 97 Small Business Edition | Word | Excel | Publisher | Encarta | Auto Map Street Plus | Outlook | Money 97

boot :44

down :02



SO CLOSE, YET SO BLOCKED All this room for ex[illegible] and the top-most PCI slot is blocked from achieving full-length status. H[illegible]

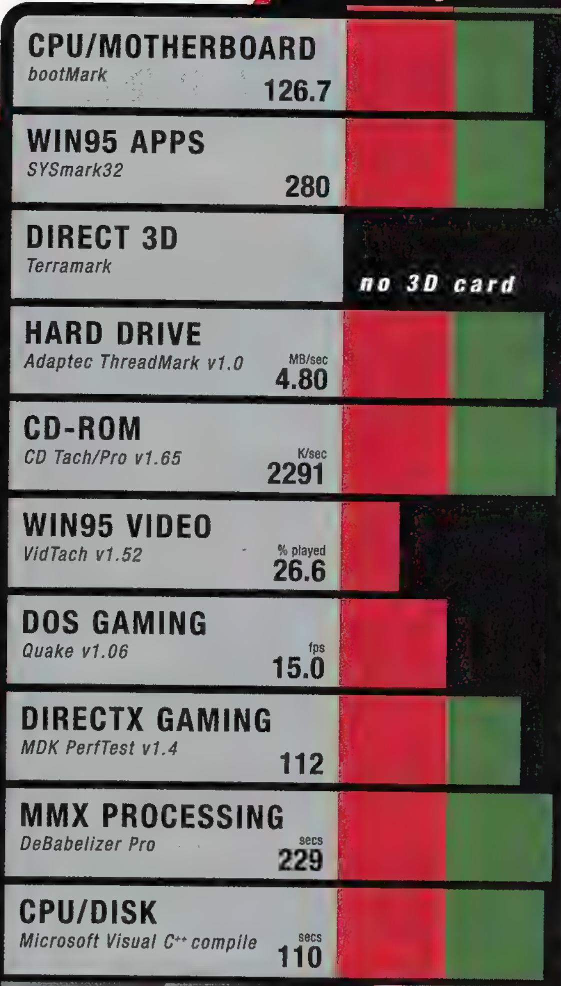
ZIP-PITY-DOO-DA Like the Micron Millennia systems, an Iomega Zip drive coughs up a cool 100MB of data storage to satisfy your needs.

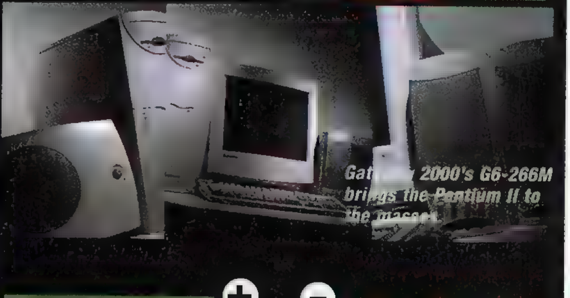
PULLED OVER FOR SPEEDING Here's the new reigning powerhouse. A single P-II 266MHz CPU opens up a serious can of kick-ass over any P200 MMX processor to date. With the P233 MMX around the corner, it'll be a fight to the finish.

real-world benchmarking

Gateway 2000

G6-266M





Gateway 2000's G6-266M brings the Pentium II to the masses.

+

- Pentium II 266MHz w/512K
- Ensoniq PCI-based digital/wavetable card
- Two PCI slots open
- Easy access to components
- Full-length card installation
- 64MB RAM
- Excellent overall performance

−

- STB Vision 95 drivers not utilized
- No VESA 2.0 support
- One PCI slot blocked by hard-drive cage
- No real-mode drivers
- Substandard Direct3D performance

Price $3,349
Company Gateway 2000
Phone 800.846.4208
URL www.gw2000.com

boot verdict 8

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

Xi K233 MTower

AMD inside

After waiting and debating for oh-so-long, AMD is ready to throw down the gauntlet and give Intel a sound thrashing with its MMX-enhanced K6 processor. Xi Computer delivered their K6-laden Xi K233 system into the loving hands of the bootLab, and now it's time to put up or shut up.

This system is nearly identical to the heartbreaking MX200 system (reviewed in *boot* 10), only two very important things have changed: The K233 has the latest revision of Tyan's S1572 ATX K6-ready motherboard and it has AMD's new 233MHz CPU.

Here's what Xi is packing inside its roomy medium-tower case this time around. The four full-length PCI/two ISA/one combo-slotted S1572 comes with six SIMM slots and two DIMM slots, one 32MB DIMM providing the RAM. STB's Velocity 3D with 8MB of EDO-VRAM delivers the graphics firepower and U.S. Robotics' Sportster 5600 ISA fax/modem handles the communication duties. Without the pathetic Addonics Sound Vision 510 ISA sound card whistling its little FM synth/software wavetable crap, the Altec Lansing ACS-45s would croon. Xi's healthy tower gives you two free 3.5-inch and three 5.25-inch drive bays for packing in more good lovin'.

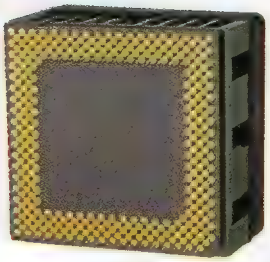
Throw in Maxtor's vertically mounted 85120A DiamondMax 4.9GB EIDE hard drive, and Hitachi's CDR-8013 EIDE CD-ROM drive, and you're ready to take the AMD plunge. Unfortunately, the K233 gives you the same heartaches as the MX200, such as the USB ports blocking one of the PCI slots (leaving only three usable PCI slots), the lack of VESA 2.0 support, and substandard Direct3D performance.

Coupled with 512K of onboard L2 cache and twice the L1 cache of the Pentium with MMX, the K6 has much to live up to. It doesn't disappoint. Under the bootMarks, the K6 233MHz drops some raw processing power, destroying the P200MHz processor in a variety of venues. It easily bests the P200 in our bootMark test, cranking out a solid 85, while SYSmark32 comes in a full 15 points faster. The *DeBabelizer Pro* processing time shows serious speed increases, shaving off almost a full minute.

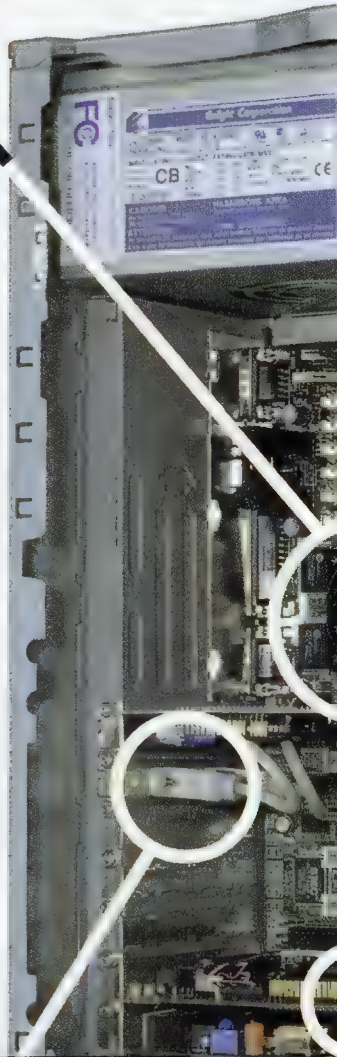
When it came to floating-point processing, the P200 MMX flexed its muscle, coming in a full 3.4fps faster that the K6 in our *Quake* benchmark, while *MDK* yields a faster system score under Intel's chip.

For the most part, AMD passed our MMX tests with flying colors, with the sole exception of Sega's *Cyber Trooper Virtual On.* AMD delivers competitive MMX firepower with the K6. Pound-for-processing-pound, the K6 is a worthy competitor to Intel's P200 MMX CPU. But AMD's power costs an extra $300, and with Intel launching 233MHz MMX-enabled processors soon and Pentium IIs already on store shelves, AMD's going to have a fistfight on their hands.

— Andrew Sanchez



SOCKET 7 SAVIOR
AMD's K6 processor sports a 233MHz speed limit, double the internal L1 cache, and the promise of 100% MMX compatibility. If your motherboard is certified K6-ready, you may want to give AMD a spin.



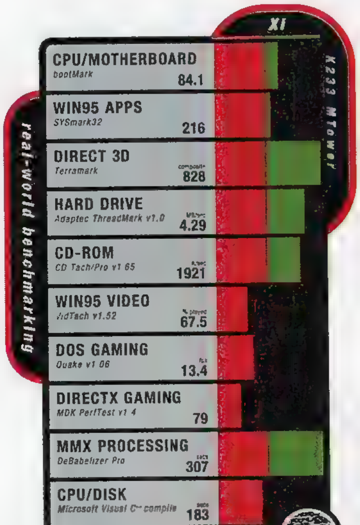
Do The Right Thing

If you're really serious about system components, Xi Computer offers upgrade paths for the power hungry. Xi Computer sent us its hardcore hardware, consisting of Creative Labs' **AWE64**, Matrox's **Millennium** with 4MB of WRAM, and Diamond's 3Dfx-powered **Monster 3D**.

With this setup, the Xi K233 MTower performed like a champ, with much better Win95 application, Direct3D, and FMV performance. Unaccelerated *Quake* still hobbled along at 13.4fps, but built-in VESA 2.0 support is a welcome sight. If you're playing plain-jane *Quake* when you have that phat 3Dfx card, you should be flogged. *GLQuake* posted 28.1fps at 640x480.

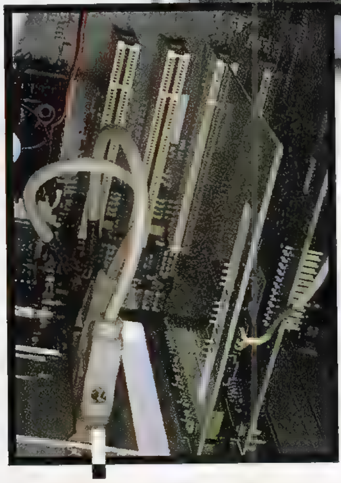
If you have the extra duccats, indulge in the better things in life and go with this configuration.

— A.S.

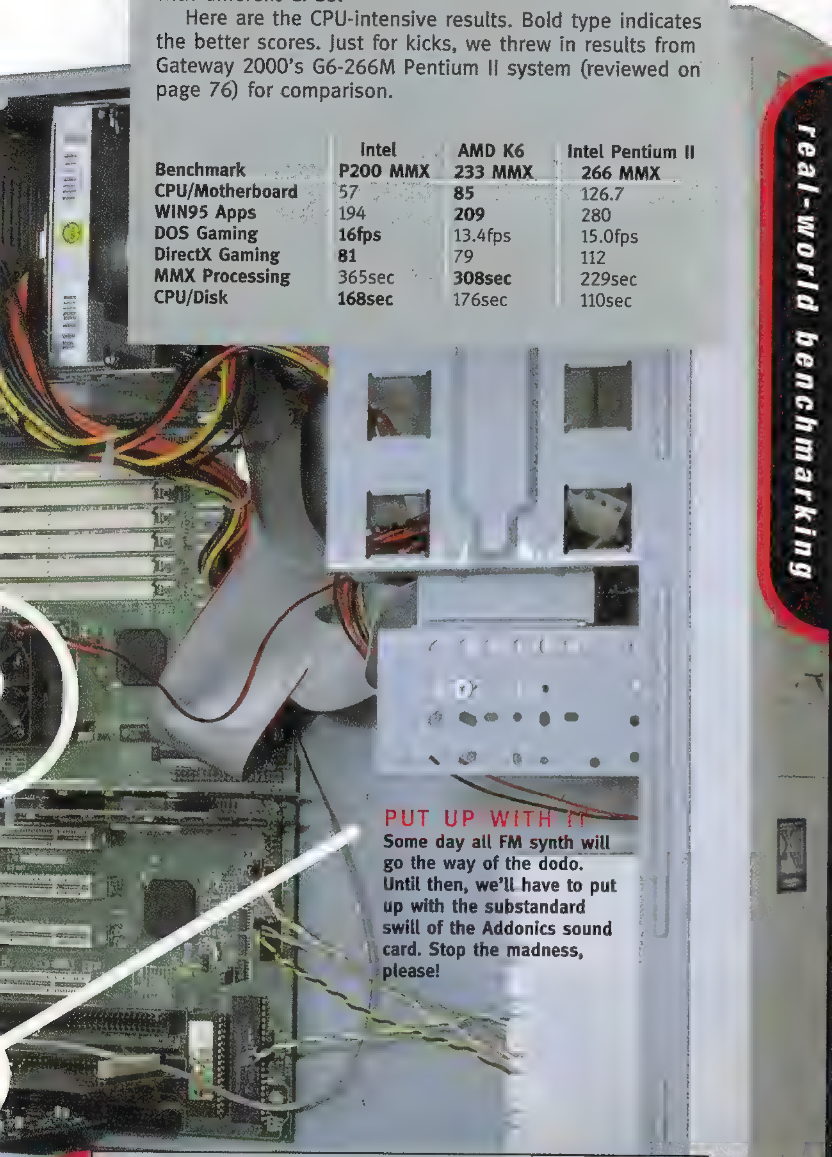


Price $3,099
Company Xi Computer
Phone 800.432.0486
URL www.xicomputer.com

boot verdict 9



FLOGGING A DEAD HORSE
The USB connector is responsible for all the PCI-blocked heartache.



Dare to Compare

What better way to pit these processors against each other than to benchmark the same system configuration, with different CPUs?

Here are the CPU-intensive results. Bold type indicates the better scores. Just for kicks, we threw in results from Gateway 2000's G6-266M Pentium II system (reviewed on page 76) for comparison.

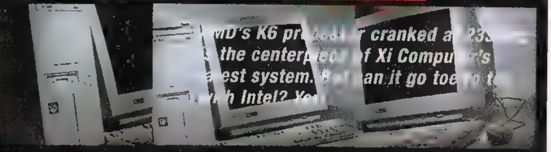
Benchmark	Intel P200 MMX	AMD K6 233 MMX	Intel Pentium II 266 MMX
CPU/Motherboard	57	**85**	126.7
WIN95 Apps	194	**209**	280
DOS Gaming	**16fps**	13.4fps	15.0fps
DirectX Gaming	**81**	79	112
MMX Processing	365sec	**308sec**	229sec
CPU/Disk	**168sec**	176sec	110sec

PUT UP WITH IT
Some day all FM synth will go the way of the dodo. Until then, we'll have to put up with the substandard swill of the Addonics sound card. Stop the madness, please!

Xi
K233 MTower

real-world benchmarking

Benchmark	Test	Unit	Score
CPU/MOTHERBOARD	bootMark		85
WIN95 APPS	SYSmark32		209
DIRECT 3D	Terramark		no 3D card
HARD DRIVE	Adaptec ThreadMark v1.0	MB/sec	4.33
CD-ROM	CD Tach/Pro v1.65	K/sec	1916
WIN95 VIDEO	VidTach v1.52	% played	29.6
DOS GAMING	Quake v1.06	fps	13.4
DIRECTX GAMING	MDK PerfTest v1.4		79
MMX PROCESSING	DeBabelizer Pro	secs	308
CPU/DISK	Microsoft Visual C++ compile	secs	176



[illegible]MD's K6 pr[illegible]r cranked a[illegible] [illegible] the centerp[illegible]f Xi Compu[illegible]'s [illegible]est system. [illegible]an it go toe [illegible] [illegible]h Intel? Yo[illegible]

+

- AMD K6 233MHz
- Excellent Win95 application performance
- Outstanding subsystem performance
- Tyan S1572 430TX motherboard
- Awesome Altec Lansing ACS-45 speakers
- Three free PCI slots
- Easy access to components
- Two free 3.5-inch and three 5.25-inch drive bays
- Mounting rails for adding 5.25-inch drives

−

- Floating-point performance not as fast as P200 MMX
- STB Vision 95 drivers not utilized
- No VESA 2.0 support
- No real-mode drivers
- Substandard Direct3D performance
- Funky Yamaha OPL-3SA synth chip
- No bundled software

Price $2,849
Company Xi Computer
Phone 800.432.0486
URL www.xicomputer.com

boot verdict
7

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

under the hood

THE BRAINS

CPU	AMD K6 233
L2 Cache	512K (external pipeline burst)
RAM	32MB DIMM (128MB maximum)
Motherboard	Tyan S1572 ATX

THE BRAWN

Video Card	STB Velocity 3D (S3 ViRGE K233) with 8MB EDO-VRAM
Hard Drive	Maxtor 8512A DiamondMax 4.9GB EIDE
CD-ROM	Hitachi CDR-8013 16x
Expansion Bus	Four PCI; two ISA; one PCI/ISA shared
Fax/Modem	U.S. Robotics Sportster 5600
I/O Ports	Two USB; two serial; one parallel

THE BEAUTY

Display	ViewSonic Optiquest V773; 0.26dpi, 1280x1024, 24-bit color @ 60Hz
Sound	Addonics Sound Vision 510 FM Synth sound card (OPL-3A chipset)
Speakers	Altec Lansing ACS-45 three-way subwoofer/satellite system

EXPANSION MAP

PCI	USB ports/blocked
PCI	Video card
PCI	Free
PCI	Free
PCI	Free/shared
ISA	Free/shared
ISA	[illegible]
ISA	Modem

THE BUNDLE Windows 95 OSR/2

boot :50
down :02

Comanche 3

Immersed in a new voxel reality

boot KICK ASS! PRODUCT

With superior graphics and an intensely accurate flight model, *Comanche 3* goes head-to-head with *AH-64D Longbow* and parks a Stinger missile in its cockpit. Featuring more than 30 missions of white-knuckle action and tons of pyrotechnics, *Comanche 3* pushes the virtual envelope.

Much of this perfection is the product of NovaLogic's new terrain-rendering engine. Voxel Space 2's the name, volume pixels are the game. The game engine assigns a third coordinate that positions the voxel in space, in addition to the X- and Y- axes that position a traditional pixel on-screen. These voxels replace polygons in the terrain; still pictures just don't do justice to the sheer splendor of flying above the most beautiful nap-of-the-earth terrain on a PC. The massive battlefields are unsurpassed by any other real-time, texture-mapped polygon world-generator.

CHECKLIST

Maximum Resolution/Color
640x480/8-bit

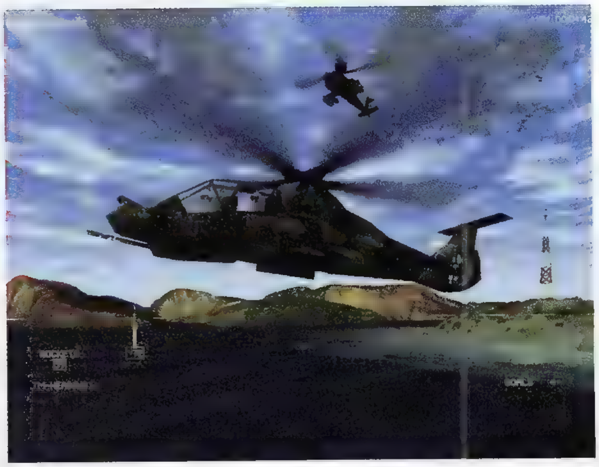
Multiplayer
IPX/LAN Modem Serial
TCP/IP Kali

Specialty Controllers
Throttle Rudder

NovaLogic pays immaculate attention to detail with semitransparent cloud cover and lens-flaring numbering among the more intense graphical bomb-drops. The sim paints everything from the hot and humid jungles to arid red deserts to the frigid white-capped mountains in 8-bit color at resolutions up to 640x480 (you may have to turn down the res on lesser machines).

Comanche 3 will take your system to the breaking point and beyond—expect about 15fps on a hearty 200MHz Pentium in a typical scene with some polygons. Get thick in battle and watch it bog down. Turning down the res is a poor solution because the expanding voxels begin to look like undulating oatmeal.

But with the right muscle, *Comanche 3* devastates.



The Comanche cruises over not-so-friendly waters.

Gone are *Comanche: Maximum Overkill*'s pixelated sprites. Flying in their place are incredibly detailed light-sourced, texture-mapped polygons: gun turrets that track targets, animated weapon bays, semitransparent glass cockpits, and polygon pilots to name a few. Objects explode in a hail of bit-mapped fury, and the polygon shrapnel actually commits collateral damage. On the not-so-good side, texture maps suffer from occasional warped perspective correction.

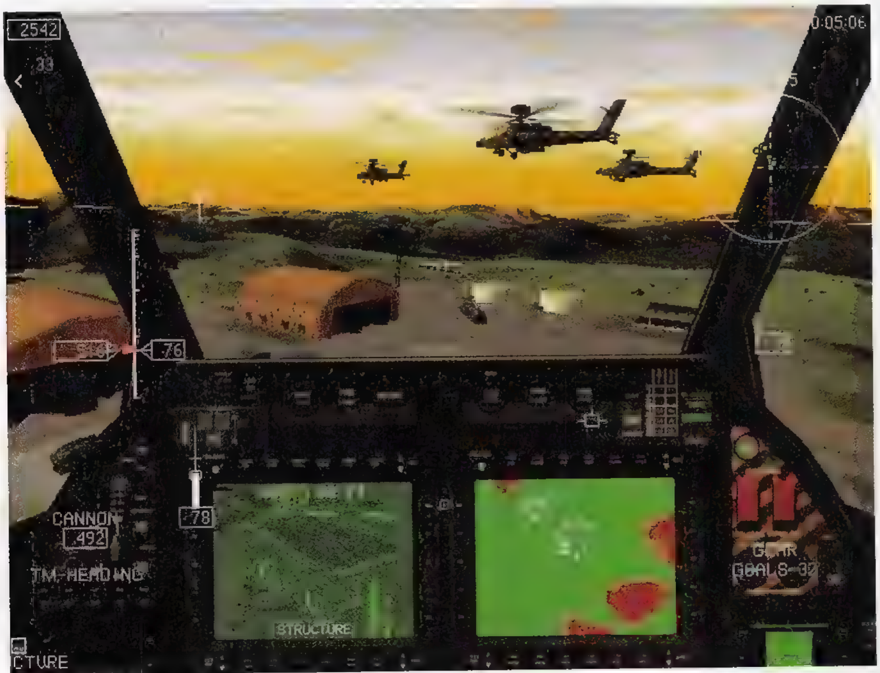
Comanche 3's sound effects are as intense as the graphics. From the distant explosions of incoming air strikes to the barely audible spinning of your blades, Dolby Surround-encoded digital sound immerses you in thunderous chain-gun mayhem and bass-laden explosions.

NovaLogic listened to hardcore flight-sim fans and the result is that *Comanche 3* comes with both an easy-to-get-into arcade mode and an ultra-realistic flight model that'll make Jane's *AH-64D Longbow* check its six.

Comanche 3 now takes into account weather conditions, In Ground Effects, and performance hits caused by collat-eral damage. With a real-world modeled physics engine in place, the copter reacts authentically to pulls on the joystick, fighting the forces of gravity and inertia as you put the Comanche through its paces. Control remains tight and responsive, with just the right amount of play.

For now, you'll have to settle for copter-on-copter violence or co-op action in the four multiplayer-specific missions or the standard free-for-alls. The only thing that could make *Comanche 3* better would be some way to integrate with NovaLogic's impending *Armored Fist II* for some crazy-sexy-cool multiplayer mayhem.

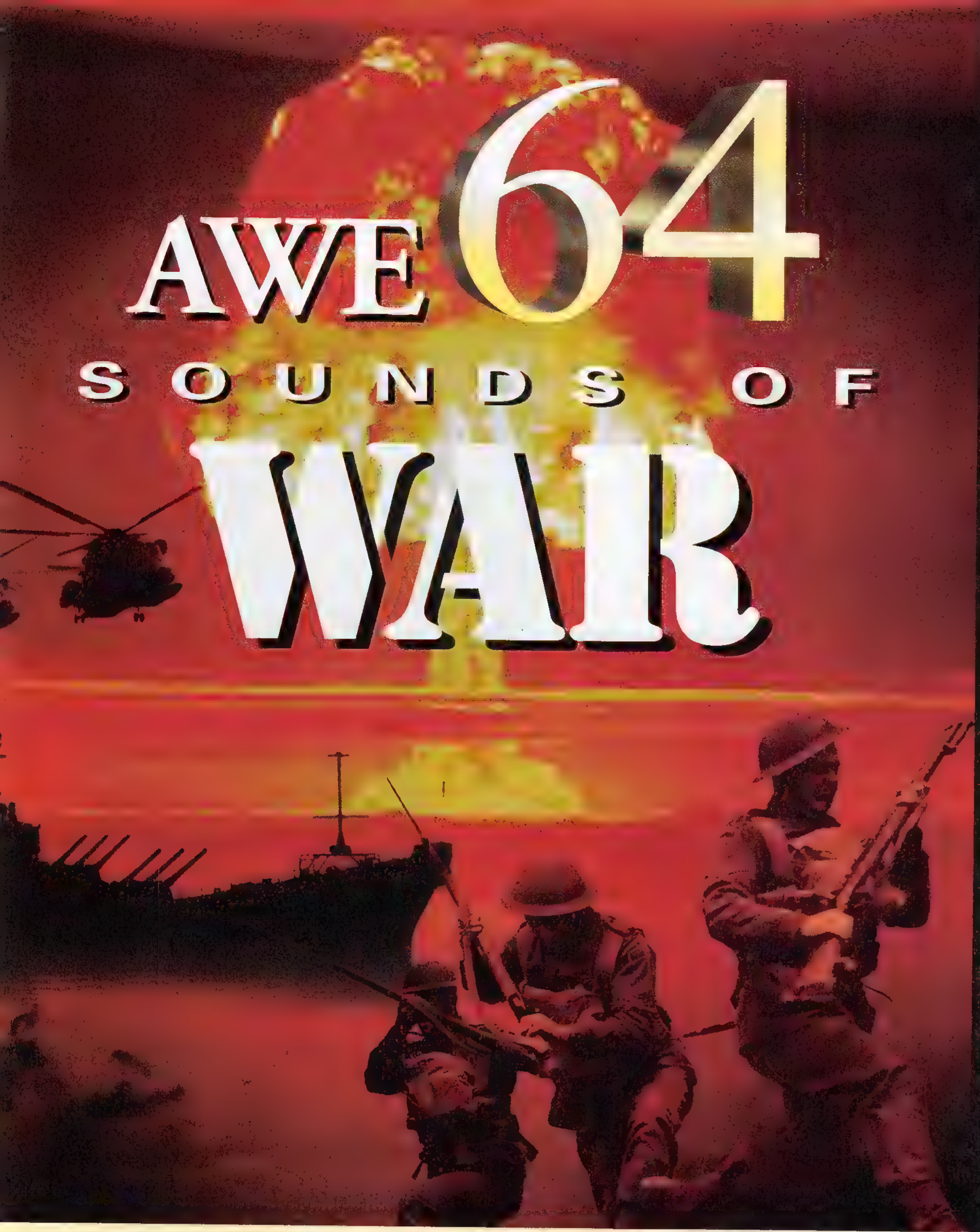
— *Andrew Sanchez*



Comanche 3's info-rich first-person cockpit view gives you everything you could possibly need to tear a new orifice out of a tank.

Price $45
Developer/Publisher
NovaLogic
Phone 800.858.1322
URL www.novalogic.com

boot verdict 9



1. Kaboom!
2. Grenades.
3. Deafening Silence.
4. 64mm Shells.
5. The Crackle Of Uzi Fire
6. "Incoming!"
7. "That Was A Close One."
8. Random Gunfire.
9. "Private Curtis Jones, 51st Airborne"
10. Anti-Tank Guns.
11. The Clink Of An Aluminum Mess Kit.
12. Dangling Dog Tags.
13. Ricocheting Bullets.
14. Sigh Of Relief.
15. A Harmonica Playing Yankee Doodle.
16. Give peace a chance.
17. Flight of the Valkyrie.
18. Shovels Diggin Trenches.
19. Prayer.
20. Dirty Jokes.
21. "Sniffle."
22. Nervous Laughter.
23. Letters From Children.
24. Bombs bursting in air.
25. Battle Plans.
26. "Over The Top, Boys!"
27. The Battle Hymn Of The Republic.
28. Bullets Whizzing Past Your Helmet.
29. Random Snipers.
30. Surface To Air Missiles.
31. Anti-Aircraft Fire.
32. The Doors Playing "The End."
33. The Whistle Of Tracers
34. "Medic! Medic!"
35. The Star Spangled Banner.
36. The Thunder Of An Air Strike.
37. "Hit The Dirt."
38. A Rain Of Debris Landing All Around You.
39. Taps.
40. "Uurrrrpp!"
41. Low Flying Sidewinders.
42. Strafing From The Air.
43. Ak-47 Assault Rifles.
44. Standard Issue M-16's.
45. The Sharpening Of Bayonets.
46. The Hiss Of Mustard Gas.
47. A Declaration Of Peace.
48. Rain.
49. Howitzers.
50. The Cheer Of Victory.
51. Quiet.
52. The Low Rumble Of Bombs In The Distance.
53. The Squawk Of A Radio Call For Help.
54. Com chatter.
55. "Surrender Now!"
56. Troops Marching.
57. Jungle Animals.
58. "The Biscuits In The Army, They Say Are Mighty Fine."
59. The Angry Croak Of Your Commander.
60. A Tropical Storm.
61. A Blazing Oil Well Fire.
62. Unrolling Adhesive Bandages.
63. "Ugh!"
64. "I Wanna Go Home."

Sound
BLASTER AWE 64 Gold

At war with your PC? Take command, with the new Sound Blaster® AWE64 Gold™, the only advanced audio card designed to upgrade your Pentium PC. Awesome audio–with up to 64 unique sounds all playing simultaneously. It's the best sounding Sound Blaster ever, thanks to our unique WaveGuide and WaveSynth™ technology. It also offers full duplex support and CD quality recording and playback, an explosive 4MB of memory for SoundFonts, true 3D Positional Audio™ and even a selection of the hottest Internet software. To learn more about the Sound Blaster AWE64 Gold contact us at:

www.SoundBlaster.com/sound/AWE64Gold.

CREATIVE®
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Product Information Number 116

X-Wing vs. TIE Fighter

A certain sacrifice

X-Wing vs. TIE Fighter brings real-time multiplayer space combat to the *Star Wars* universe with a vengeance, sacrificing almost everything else in the process.

The razor-sharp SVGA visuals in *XvT* are LucasArts' best for a space combat sim, but they can't compete with *Wing Commander IV* and *Privateer 2*'s graphics muscle. Following the lame intro video, the optimized *X-Wing* gaming engine blasts past the original with new visual tricks. High-resolution texture maps lifted from the *Star Wars* film archives grace the Gouraud-shaded, light-sourced polygon objects, including the nine spacecraft. Explosions light the bow of capitol ships as you jockey for optimal firing position.

Playable in three graphics modes and 64K-color depth, the engine incorporates specular highlights and even software MIP-mapping for some groovy textures. You'll crack a smile when you notice enemy TIE fighters tossed about, momentarily spinning out of control after getting a taste of your proton torpedoes. You even take damage from backwash if you stray too close to those massive Star Destroyer engines.

With every graphical feature turned on, traversing the depths of space results in a smooth 24fps on a P200MMX, but you bog down to single-digit frame rates with one massive capitol ship, multiple fighters, and myriad explosions going off in your face. Too bad *XvT* doesn't support 3D acceleration.

Despite the attention to graphic detail, sloppiness takes away from *XvT*. Star Destroyers blow up unceremoniously in low-frame count, pixelated, sprite-based explosions, making you long for the gloriously tortured Kilrathi carrier deaths of *Wing Commander IV*. The dated, bland star-field backdrop and canned star-fighter explosions haven't changed since the original. *XvT* could also use some of *Darklight Conflict*'s (reviewed on page 110) colored lighting effects.

The multichannel digital effects are a mixture of weapon and engine effects lifted from the movie (nothing compares to the whine of those twin-ion engines), to painfully repetitious speech and pilot chatter that will make you wish you were flying alone. John Williams' way-too-epic CD-audio soundtrack is the only saving grace.

Make no mistake, *XvT* is designed from the ground up as a multiplayer extravaganza. The pitiful excuse of strung-together solo missions pales in comparison to the original *X-Wing and TIE Fighter*'s immersive storylines, where you are a part of the *Star Wars* saga. So, don't even go there.

But, if you're after white-knuckled, turn-and-burn space combat against a group of your closest friends, *XvT* is your cup of tea. *XvT* has one of the friendliest interfaces to ever grace a CRT. Connecting up to eight players over IPX is a painless, point-and-click affair; one machine hosts a session and other terminals join in. Four-player TCP/IP mayhem packs much goodness, including an integrated ISP tester that will give you instant access to your latency and packets dropped with just a point of your cursor. Multiplayer combat will range anywhere from simple free-for-alls to massive combat engagements where teamwork is essential if you want to collect those victory points. The game keeps pilot rankings throughout your career, with 25 ranks available for bragging rights over the net. In this regard, XvT has the multiplayer aspect down.

But tired graphics and limp solo missions make it hard to recommend *X-Wing vs. TIE Fighter*... unless you absolutely *must* have the *Star Wars* multiplayer experience.

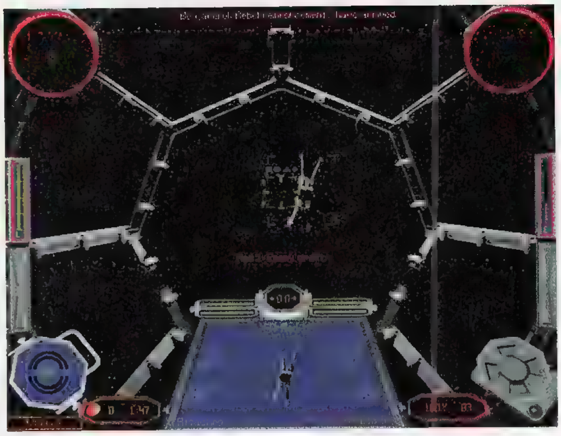
— *Andrew Sanchez*

CHECKLIST

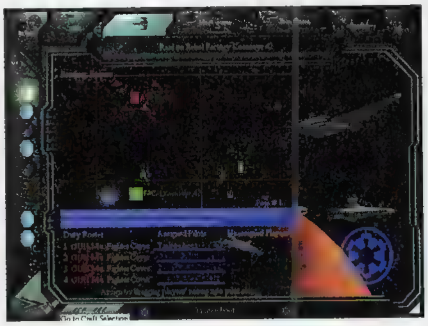
Maximum Resolution/Color
640x480/16-bit

DirectX
DirectDraw DirectSound
DirectPlay DirectInput

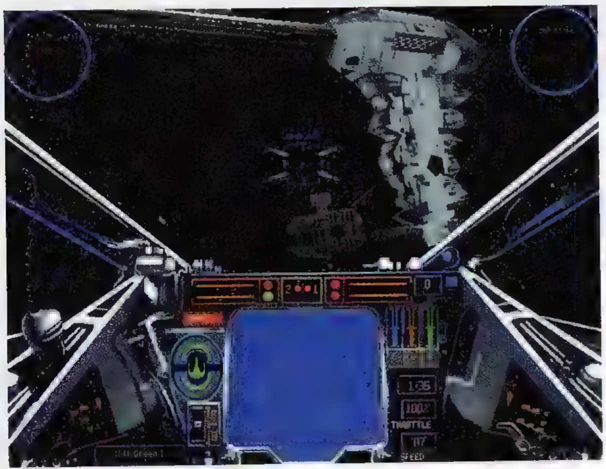
Multiplayer
IPX/LAN Modem Serial
TCP/IP



A Rebel X-Wing is about to feel the laser-induced heat from your TIE fighter in LucasArts' *X-Wing vs. TIE Fighter*.



Assess your combat situation and choose your weapons carefully.



A Nebulon-B frigate gets into some intense capitol ship combat, and you're caught right in the thick of it.

boot verdict 6

Price $50
Developer Totally Games
Publisher LucasArts
Phone 800.985.8227
URL www.lucasarts.com

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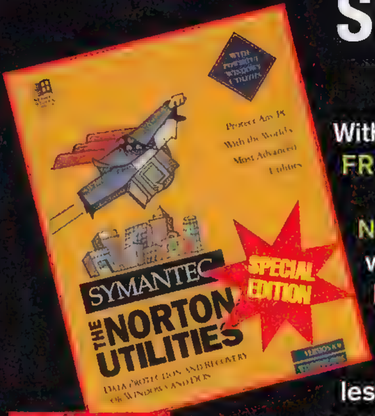
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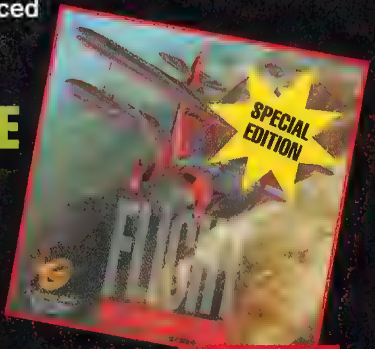
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http://www.ebworld.com

Product Information Number 131

Internet 3D **Space Builder 2.1**

We've got VRML in the house

As PC-based VRML construction tools go, the latest update of Paragraph's *Internet 3D Space Builder* version 2.1 is state of the art; nothing comes near its power, flexibility, and robustness—and certainly not at its price.

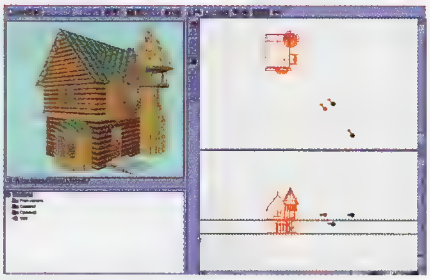
Although architectural spaces are very bandwidth-heavy, difficult to construct, and, so far, uninspiring elements of VRML content, VRML tools persist in focusing on this type of space, *ISB* included. *ISB* has the interface of a CAD program and the bundled content consists almost exclusively of items associated with architecture. The galleries are extensible, though, and can be filled with images, shapes, and 3D objects you create in *ISB*.

You must be comfortable with the technical aspects of 3D shape manipulation, camera positioning, texture mapping, and the like to expect predictable results. This may take some practice. That said, *ISB* offers a wealth of components to get you started, including large galleries of shapes, textures, and images, as well as full scenes. To preview gallery items, simply point at a 3D object to nudge it into fully rendered rotation for 360-degree viewing, or view a "movie" (animated GIF) in place before inclusion.

ISB can import geometry from *3D Studio Max* (.3ds) files, has impressive "file compression" abilities (analyzes your material and reuses pieces where possible), supports Direct3D and MMX for accelerated rendering, and sports one-click publishing of your VRML content to the web. The quality and speed of the rendering is stellar, and there's extensive support for editing texture-mapping parameters as well as the actual textures.

Really nifty VRML 2.0 material incorporates animated objects interacting with each other and with the user. *ISB* doesn't provide any way to use these features of the language, but if you can live without them, you'll find *Internet 3D Space Builder* a useful tool.

— *Neil Redding*



Internet 3D Space Builder **sports a fully customizable interface, complete with gallery windows for all sorts of content components (bottom and right side), the beautifully rendered Perspective View (upper left), and wireframe top and front views for precise sizing and alignment.**

Price *$90*
Developer/Publisher
Paragraph International
Phone *800.810.0055*
URL *www.paragraph.com*

boot verdict 8

Moto **Racer** GP

Crank the throttle on 3D acceleration

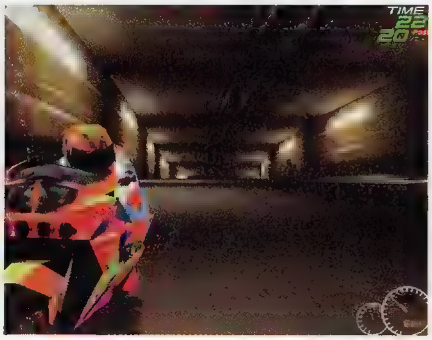
Moto Racer GP's Direct3D engine explodes with MMX-enhanced power, sending the front wheel toward the heavens and the tach toward redline as quickly as you can row through the six-speed tranny. This crotch rocket burns rubber into PC racing-game asphalt, bringing home the high resolutions, colors, and solid frame rates of arcade motorcycle racers.

Moto Racer's first- or third-person perspective texture-mapped polygons fly at rates that will have you pulling polygon bugs from your teeth. The game only runs in 16-bit color, but resolutions can be tailored from 320x200 to 640x480. The Direct3D-accelerated graphics add bilinear filtering on 3Dfx, Rendition, and PowerVR-based cards (3Dfx wins the frame rate competition with a silky 30+fps), although light sourcing is disappointingly absent. As fast as the game goes, it still can't escape on-screen polygon redraw where the terrain meets the horizon.

Boasting nine tracks varying from a dirt-filled arena to the Great Wall of China, *Moto Racer GP* adds a reverse mode and pocket mode to keep you in two-stroke bliss. The game requires different techniques on the different types of track: the high-speed hold-on-for-dear-life-as-you-slam-into-a-corner superbike roadways and the dirt-kicking, woopdie-bouncing, kidney-rattling motocross dirt tracks. Rounding out the package are aggressively competitive AI-controlled components and multiplayer support for eight connections.

Moto Racer leaves its mark at the top of the motorcycle racing heap with intense frame rates and gorgeous texture-mapped polygons that blow away what previously passed as motorcycle racing on the PC.

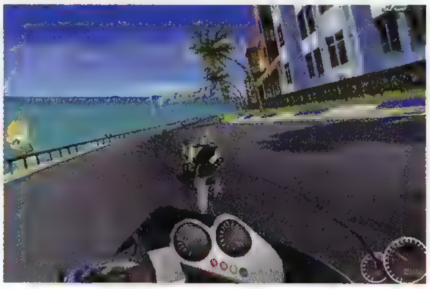
— *Sean Downey*



Moto Racer **is one of the best-looking games to race across our 3D accelerators.**

CHECKLIST

Maximum Resolution/Color
640x480/16-bit
Win95 Native
DirectX
DirectDraw DirectSound
DirectPlay DirectInput
Direct3D
Multiplayer
IPX Modem Serial TCP/IP
Specialty Controllers
Win95 compatible



First-person is the best way to experience ***Moto Racer GP*****, with the front tire shimmying as you fly around a corner, shaking the bike and the screen.**

Price *$50*
Developer *Delphine*
Publisher *BMG Interactive*
Phone *415.330.0470*
URL *www.mracer.com*

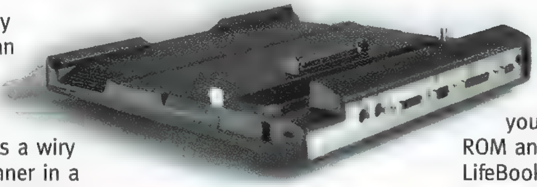
boot verdict 9

Fujitsu **LifeBook** 655Tx

Beauty that's deep

With a main body that's just over an inch thick and weighs less than five pounds, the LifeBook 655Tx is a wiry long-distance runner in a world of sweaty fat men. It fits inside just about any briefcase, and is so light, your shoulder may never feel its weight. A well-designed notebook, however, should also be a worthy stand-in for a desktop machine—full-featured and powerful. Here the LifeBook makes a valiant effort, but falls a little short of being a total dream come true.

For its top-of-the-line notebook, Fujitsu went with Intel's 150MHz MMX chip instead of Intel's top-of-the-line mobile 166MHz Pentium. The CPU is further hampered by a slower hard drive and graphics system than we would have liked. At least the 4MB/sec IrDA goes all-out, blowing away the more common 115K/sec. Of course, there's neither wavetable sound nor 3D support (we are eagerly counting the days until these desktop must-haves make their way to our laps). Video playback support is better than for most notebooks, but the full-screen scaled quality of our MPEG-1 sample files leaves a lot to be desired when compared to the best desktop systems.



ENHANCE THIS

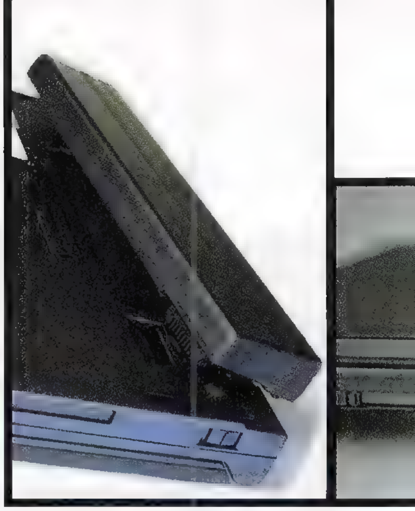
The "Enhancement Unit" adds stereo speakers, CD-ROM, floppy, and joystick ports with just one click, snapping on without the need to remove the second battery. This isn't your typical leave-it-at-home docking station either. With the base attached, the LifeBook 655Tx weighs less and is smaller than many media notebooks, and it's still battery powered.

The most remarkable thing about this notebook is its split design. Whenever you don't need your CD-ROM and floppy, just split the LifeBook in half and chuck the jetsam. More importantly, the LifeBook's base unit gives you simultaneous access to both drives when you do need them, precluding the hassle of choosing one drive over the other. The only thing that's missing is the ability to hot-dock and separate. (If you want to change configurations you must power down—a relatively minor annoyance.)

When a design is this good, it's hard to quibble for long. In fact, just one more plus would probably have pushed this machine into Kick-Ass territory.

Sometimes you want it light, and sometimes you want it all. A notebook that gives you both is a rare find, and the LifeBook 655Tx gives you a good balance of the two for $4,000. Bueno!

— *Chris Dunphy*

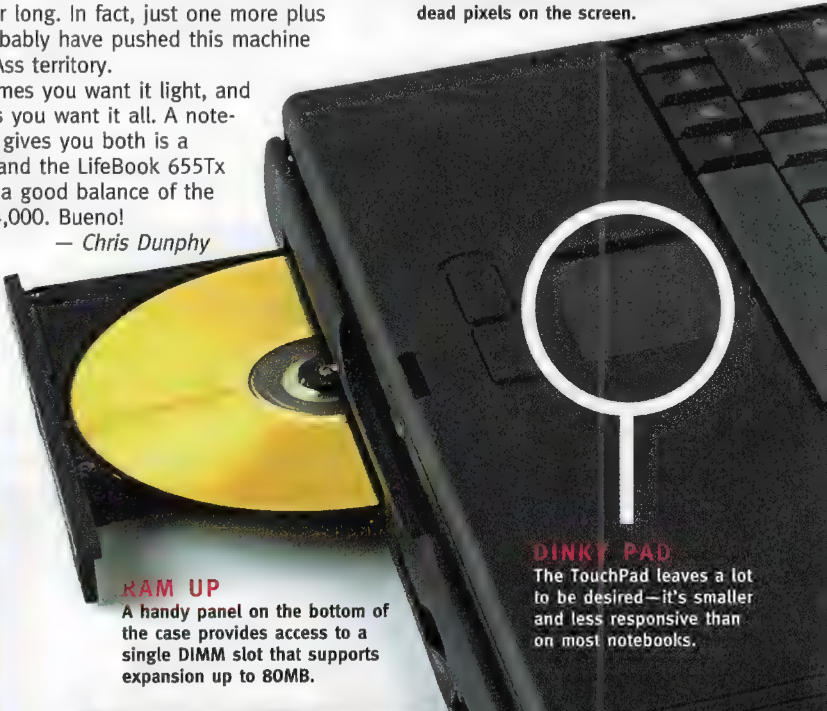


STACK IT

The Fujitsu LifeBook 655Tx lets you take as much of the notebook as you need on the road. The second battery even doubles as a keyboard prop when you are not docked with the base.

BIG AND BRIGHT

Though we wish it did 1024x768, the 12.1-inch 800x600 TFT LCD screen is bright and has good off-axis viewing. The analog brightness dial, however, has very little effect and our review unit suffered two dead pixels on the screen.



DINKY PAD

The TouchPad leaves a lot to be desired—it's smaller and less responsive than on most notebooks.

RAM UP

A handy panel on the bottom of the case provides access to a single DIMM slot that supports expansion up to 80MB.

under the hood

THE BRAINS	
CPU	150MHz Intel Pentium with MMX
L2 Cache	256K (pipeline burst SRAM)
RAM	16MB EDO DRAM (80MB maximum)
Video	Chips & Technologies CT65550 (2MB VRAM)
THE BRAWN	
Hard Drive	1.3GB
CD-ROM	8x (in the Enhancement Unit)
Expansion Bus	Two Type II PCMCIA; CardBus and Zoom Video compatible
I/O Ports	One serial; one parallel; monitor; keyboard/mouse; external floppy. (Enhancement Unit adds a game port)
Lap Weight	4 pounds, 7 ounces; (5 pounds, 8 ounces with both batteries)
Carrying Weight	8 pounds, 7 ounces (with base and power brick)
THE BEAUTY	
Display	12.1-inch TFT screen
Sound	ES1878 AudioDrive, Sound Blaster 16 compatible
Video	800x600, 16-bit color
Speakers	Mono in main unit, stereo pair in the base
Communication	33.6Kbps fax/modem (no speakerphone or DSVD); 4MB/sec IrDA

REAL-WORLD BATTERY LIFE 01:59:48

THE BUNDLE Windows 95 (OSR/2) | WebEx | Quicken SE | LapLink | Microsoft Works | Smart Games Challenge I | First Aid 97 Deluxe | PC-Doctor

boot	down
:54	:09

FLOPPY STUFF
The external floppy drive comes packaged in a compact case—perfect for those long trips.

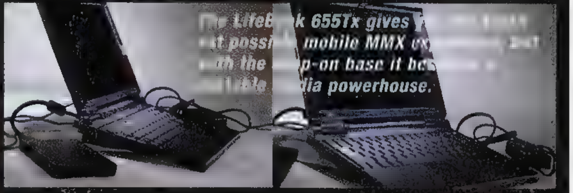
SOUND OFF
There's a handy external volume control on the right-front of the case where you can also find headphone and line-in jacks. (You may need them—the internal mono-speaker is tinny and the stereo pair in the base aren't much better.) There should be a sound-out jack on the back of the base for hooking up external speakers; without one, you're left with a wire running to the front of your keyboard—a rare oversight in such a thoughtful design.

Fujitsu

LifeBook 655Tx

real-world benchmarking

Test	Benchmark	Result
CPU/MOTHERBOARD	bootMark	40.7
WIN95 APPS	SYSmark32	121
DIRECT 3D	Terramark	no 3D card
HARD DRIVE	Adaptec ThreadMark v1.0	MB/sec 1.93
CD-ROM	CD Tach/Pro v1.65	K/sec 1237
WIN95 VIDEO	VidTach v1.52	% played 59
DOS GAMING	Quake v1.06	fps 13.0
DIRECTX GAMING	MDK PerfTest v1.4	69
MMX PROCESSING	DeBabelizer Pro	secs 508
CPU/DISK	Microsoft Visual C++ compile	secs 289


The LifeBook 655Tx gives [illegible] est possible mobile MMX ex[illegible] with the [illegible]p-on base it be[illegible] [illegible]dia powerhouse.

+
- Beautiful two-piece design
- Small, light-weight main unit
- Simultaneous CD-ROM and floppy
- 4MB/sec fast IrDA
- Expandable to 80MB
- CardBus and Zoom Video port compatible
- Comes with a second clip-on battery

−
- Mono-speaker on main unit
- No VESA 2.0 support
- FM-synth sound
- Dinky TouchPad
- No audio line-out of base unit
- Must switch between IrDA and modem in the BIOS
- No hot docking

Price $3,999
Company Fujitsu PC
Phone 888.466.8434
URL www.fujitsu-pc.com

boot verdict 9

A complete breakdown of benchmark results is available on the *bootNet.* Point your browser to www.bootnet.com

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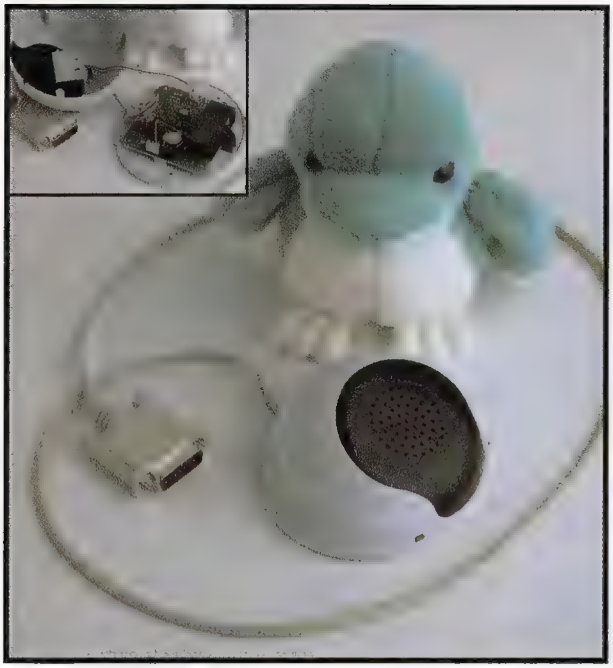
Product Information Number 306



Fin Fin on **Teo**: The **Magical Planet**

Plastic fantastic friendship

Unlike programs where you adopt a virtual kitten or puppy, Fin Fin is real—at least in a physical sense. You can put Fin Fin's "body," a small oval peripheral that constantly monitors your world for sounds and movement right on your desktop.

On-screen, the pre-rendered dolphin/bird reacts as if you were perched next to him. Whistle softly and, if he recognizes your tone, Fin Fin will fly to you. Proffer a berry and he just may gobble it up. The more nurturing you are, the stronger your friendship.

In typical *boot* manner, we dissected our lil' buddy's plastic carcass to see what makes him tick (so much for that old adage, "friends don't dissect friends"). Fin Fin connects to the PC via the game port, and inside are sensors to detect sound volume and pitch, as well as proximity motion.

If you have the self-esteem to survive your co-workers laughing at you while you and Fin Fin quietly coo to each other, don't be surprised when that laughter turns to incredulity. Put simply, having Fin Fin around is a hoot.

— *Bryan Del Rizzo*

Price ***$60***
Company ***Fujitsu Interactive***
Phone ***888.992.5433***
URL ***www.fujitsu-interactive.com***

boot verdict 8

Pioneer DVD-ROM

Swings both ways

Whether you're into EIDE or SCSI, Pioneer has a DVD drive to suit that's eager for a new home.

Pioneer dishes up a double dose of DVD goodness with its DVD-A01X EIDE and DVD-U01 SCSI Digital Versatile Disc players. Making the rounds in OEM distribution channels, don't expect any hefty software bundles when you inevitably find these drives on some retailer's shelf. But if you're looking to pump up your system, the Pioneer DVD drives may be what you're craving.

Capable of performing all the neato-burrito DVD tricks that the kits from HiVal and Creative Labs (reviewed in *boot* 10) can, the only additional thing the Pioneer drives require is an MPEG-decoder card. While this may revolt those seeking an all-in-one DVD solution, there are ways to include these drives in your life. If you wanna buy your own MPEG-2 decoder board or are willing to push your beefy Pentium II processor and team it with a video card offering hardware-assisted MPEG-2 software decoding, then you should consider these Pioneer drives as serious contenders.

Both flavors of the drive are fully Plug-and-Play compliant, installing without a hitch. Win95 correctly identified the hardware, and with Quadrant's Cinemaster MPEG decoder board ready to rock, we proceeded to dig deep into DVD.

With the EIDE drive wired into the secondary master channel and the SCSI drive attached to Adaptec's 2940UW controller card, they both spun almost identically, spewing data at a record rate. The CLV CD-ROM data-transfer rate fell well within the published 1500K/sec specification, while both drives posted the fastest comparable CD-ROM speeds for DVD drives to date. In conjunction with the Cinemaster MPEG-decoder card, both drives performed effortlessly, providing full-screen DVD movie enjoyment. Movie playback proved uneventful, as it should, with no skipped frames. Unfortunately, we had trouble getting the drives to work with Creative's decoder board, so choose your hardware with care.

With data transfer rates finally encroaching upon CD-ROM territory, one of these Pioneer DVD drives would make a worthy addition to your system.

— *Andrew Sanchez*

Price ***$300***
Company ***Pioneer New Media Technologies***
Phone ***800.444.6784***
URL ***www.pioneerusa.com***

boot verdict 8

Dare to Compare

Here's how the first-generation DVD drives stack up as CD-ROM drives. Bold indicates better performance.

CDTach Pro v1.65	**Pioneer**	**Panasonic**	**Toshiba**
16K Average Transfer Rate	**1469**	904	1200
Random Access Time (ms)	129	161	**123**
Comparable CD-ROM Speed	**9.6x**	6x	8x
CD-ROM Type	CLV	CLV	CLV

Next Gen **Sound Cards**

3D Audio, Dolby Pro Logic, PCI-based: it's all good

Indulge in a little aural pleasure—something here's bound to catch your ear. This is the year that the entire sound-card industry tries to break the bonds of Sound Blaster compatibility. While Creative Labs blissfully continues on its ISA way, others are unleashing their PCI-based digital devices on your world, throwing claims of 100%-pure Sound Blaster compatibility and scatter-gather distributed DMA at you, and bombarding you with catch phrases such as "3D positional sound acceleration."

But, in this time of 44kHz digital audio, don't count out the lowly MIDI just yet—the cleanest waves and coolest timbres await.

— Andrew Sanchez

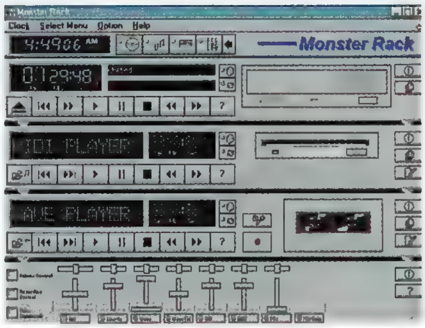
Diamond **Monster Sound**

Diamond's Monster Sound is the first sound card to offer full four-speaker surround sound based on Microsoft's emerging DirectSound 3D API in Win95. It's also the first card to combine the high-bandwidth PCI bus with onboard acceleration (using DSP components from Analog Devices) to offload your system's CPU while handling up to 24 independent 44kHz audio streams.

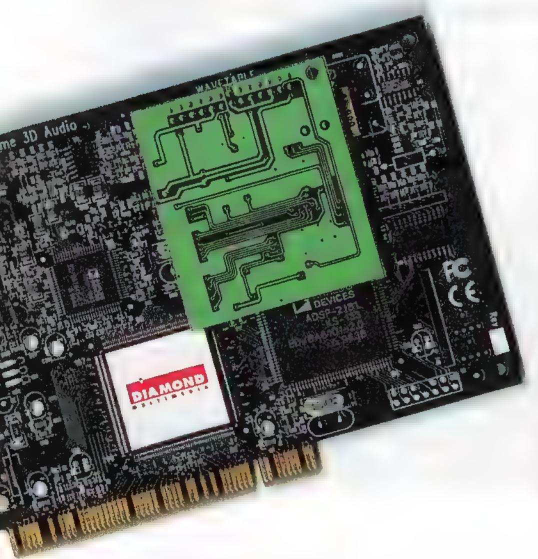
Painless Plug-n-Play installation on our test system quickly had the speakers emitting sounds marginally clearer than the incumbent AWE32. A second pair of speakers enhanced 3D sound quality for a truly immersive sound.

Several 3D-audio demos are included with the Monster Sound. In one, a polygon helicopter flies around inside a 3D window, with the whup-whup sound convincingly following it around the room. (Activision's *HyperBlade* takes advantage of this effect, creating a background of crowd noise while tracking the sound of players skating around the zeppelin-shaped field.)

The power of the PCI bus shines when it comes to mixing multiple digital signals. We mixed eight WAV files, cranked the sampling rate up to 100kHz, and CPU utilization cruised along at an ISA-humbling 3% (most ISA-based cards will utilize 10% or more).



Diamond Monster Sound's Monster Rack includes MIDI, WAV, and CD players.



Monster Sound's limitation is that it only works in Win95. There's an emulator for older games that run in DOS sessions, but it's a pain to set up, demanding two hardware interrupts in addition to the one grabbed by the Monster card. Sound quality in DOS mode is fairly muddy, but the card runs smoothly with *Quake* and *Dark Forces*. Another anomaly involves the unit's dual outputs: Unless your software can directly address both outputs independently, you can't fire discrete digital sounds from *Sound Forge* across them.

For absolute compatibility, use the Monster Sound alongside Creative Labs' Sound Blaster card using Diamond's remarkably bulky patch cable to connect them. Assuming that game support for DirectSound 3D materializes, the Monster should become a coveted part of the ultimate gaming system.

— Frank Lenk

Price $200
Company Diamond Multimedia Systems
Phone 408.325.7000
URL www.diamondmm.com

boot verdict
7

MaxiSound **Home Studio Pro 64**

The Home Studio Pro 64 is more than just a complete digital recording studio in a box. It's also one of two hot prospects in 3D, four-channel audio.

The system's core is the Dream DSP. Running at an amazing 50 MIPS, this chip has the power to handle very high-end music studio chores. For starters, it does 64-voice wavetable synthesis without ever bothering your system's main CPU. It can also simultaneously record up to eight digital tracks, with effects such as reverb, chorus, and delay applied in real time. The included Quartz *AudioMaster SE* sequencer lets you add another 64 MIDI channels.

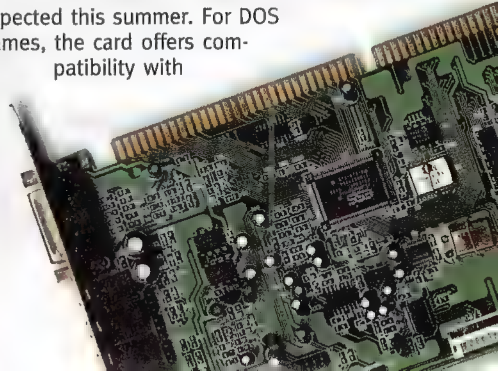
For immediate playback, the card drives four independent audio-output channels. However, for serious recording, two channels output directly to DAT or other digital media via S/PDIF in/out connectors mounted on a secondary backplate.

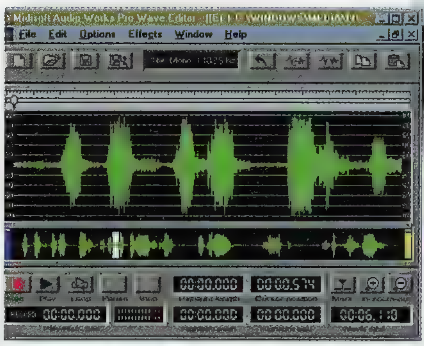
In addition to *AudioMaster*, Home Studio's extravagant software bundle includes Midisoft's *Audio Works* WAV recorder/player/editor, several custom instrument editor and downloader utilities, and a registered copy of *Internet Phone*.

Quickly installed in an ISA slot, the card sounded notably cleaner and quieter than the Sound Blaster AWE32 it replaced. With 4MB standard memory, the Home Studio offers audibly superior instrument samples, featuring crisp cymbals and vividly plunky piano sounds.

Then comes the real fun: a utility that loads (and creates) custom DSP-1 configurations for existing games.

The card also does full, four-channel positional 3D audio. Unfortunately, software to test this wasn't available, although Ubi-Soft already had a special version of *Pod*, and reported that more games would soon have patches to add "level one" 3D-sound support. The card's native SDK is being translated from French, and accelerated drivers for Microsoft's DirectSound 3D are expected this summer. For DOS games, the card offers compatibility with





The Home Studio Pro 64 comes bundled with Midisoft's *Audio Works,* which lets you edit WAV files.

the somewhat obsolete Sound Blaster Pro. It's tricky to get all the interrupts to match up, but when they do the sound in games such as *Duke Nukem 3D* is excellent. Gamers will probably agree that dazzling DSP effects and the promise of full 3D sound more than make up for some extra effort tweaking older DOS games. Aspiring musicians have even less to ponder: the Home Studio Pro 64 does just about everything they could possibly want.

— *Frank Lenk*

boot verdict 8

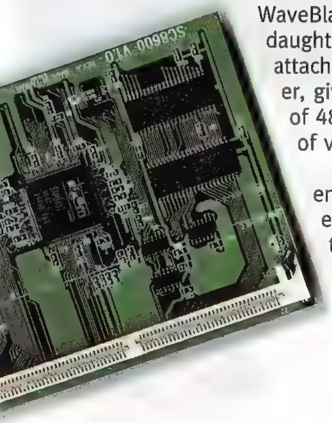
***Price** $299*
***Company** UbiSoft Entertainment*
***Phone** 800.824.7638*
***URL** www.ubisoft.com*

Turtle Beach **Pinnacle**

The Pinnacle's mic input doubles as the S/PIDF digital I/O via an 1/8-inch-to-RCA Y-cable.

The Pinnacle with Digital I/O is Turtle Beach Systems' new flagship sound card, and deservedly so. This card is ultra quiet with a S/N of less than -97dB (A-weighted) and -90db stereo crosstalk, with a frequency response of 10Hz to 22kHz and a variable sampling rate of 5kHz to 48kHz.

Onboard is the 32-voice (at 48kHz) Kurzweil MA-1 MASS Synth Engine with VAST Architecture and 4MB of sample ROM (compressed to 2MB via a proprietary K8 technique). There are also two 72-pin SIMM sockets to plug in up to 48MB of RAM. This memory can replace any of the patches in the single GM bank. Additionally, any standard WaveBlaster-compatible daughtercard can be attached via the header, giving you a total of 48 MIDI channels of voices.



The Kurzweil engine recognizes every MIDI controller and can even implement them dynamically without zippering. Reverb and chorus levels can be individually controlled on every MIDI channel. The synth engine is also velocity and aftertouch sensitive.

All the I/O plugs are 1/8-inch jacks—aside from the standard joystick/MPU-401-compatible MIDI connector (ironically, no cable is included)—and include: line-in, aux- in, mic/digital I/O, and line-out jacks. With the digital I/O board installed, the mic-in becomes the S/PDIF connector via an included Y-cable after a simple jumper change.

Transferring to and from DAT is easy and the current driver v1.20 will auto-switch to the correct rate. We couldn't transfer a 22kHz, 16-bit stereo file digitally to DAT, but a 16-bit, 44kHz mono file did transfer. A real-time sample-rate conversion would be nice, so any audio leaving the card would go out the digital-out port as well, but with all that this card offers, we're not complaining. Most disappointing is that, unlike Creative Labs' AWE64 Gold, the Kurzweil synth doesn't go through the digital output.

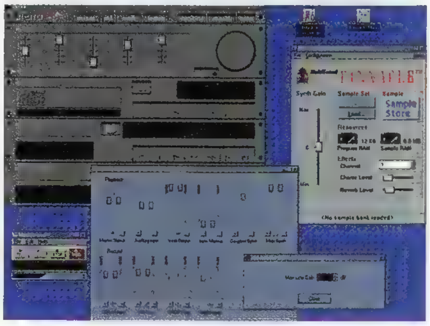
Included in the package is *Wave SE-II* for sampling sounds and uploading them to the sample RAM, and Voyetra's *Digital Orchestrator Plus*, a multitrack digital audio/MIDI sequencer. Turtle Beach also adds its own mixer applet, which has meters for every I/O source and allows precision dB setting.

The Pinnacle's minor flaws don't mar its sound quality, and are only a slight inconvenience. All in all, this card's amazing.

— *Daevid Vincent*

boot verdict 9

***Price** $499 with digital I/O board; $429 without*
***Company** Turtle Beach Systems*
***Phone** 800.233.9377*
***URL** www.tbeach.com/products/pinnacle.htm*



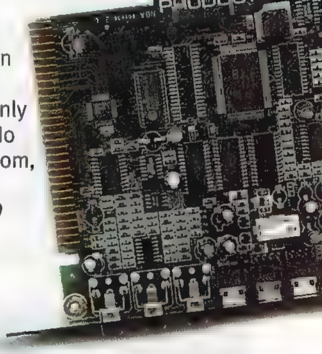
The Pinnacle comes with an enhanced mixer application as well as other useful utilities.

miroMedia **Surround**

If you're hard up for some real Dolby Pro Logic surround sound, the miroMedia Surround card is just what you need to shake those two-channel blues.

This card is the real deal, a free 8-bit ISA slot is all you need for five-channel bliss. Of course, you'll still need a killer sound card, this baby's just for powering the Dolby Pro Logic circuitry. Consuming a solitary hex address, installation is a no-brainer. A single 1/8-inch mini-jack interfaces to your current card, while mini-jacks for front and rear outputs—as well as male and female nickel-plated RCA connectors for the rear surround speakers and center channel—extend down the card's panel.

boot KICK ASS! PRODUCT



But you say you only have two speakers? No problem. Enjoy phantom, center-channel tuning using miroMedia's *3D Phonics* software.

We put the card through its paces with *Wing Commander IV* and *F-22 Lightning II.* While the 3D does widen the soundstage and solidify a center channel with only two speakers, the miroMedia's true potential is realized with a full five-speaker system. Each channel receives the proper signal and sound fills the room with enemy MiGs strafing from speaker to speaker.

The miroMedia Surround is a worthy addition to any serious gamer or audiophile's system. Team it with DVD, and fasten your seat belt. Why didn't someone think of this before?

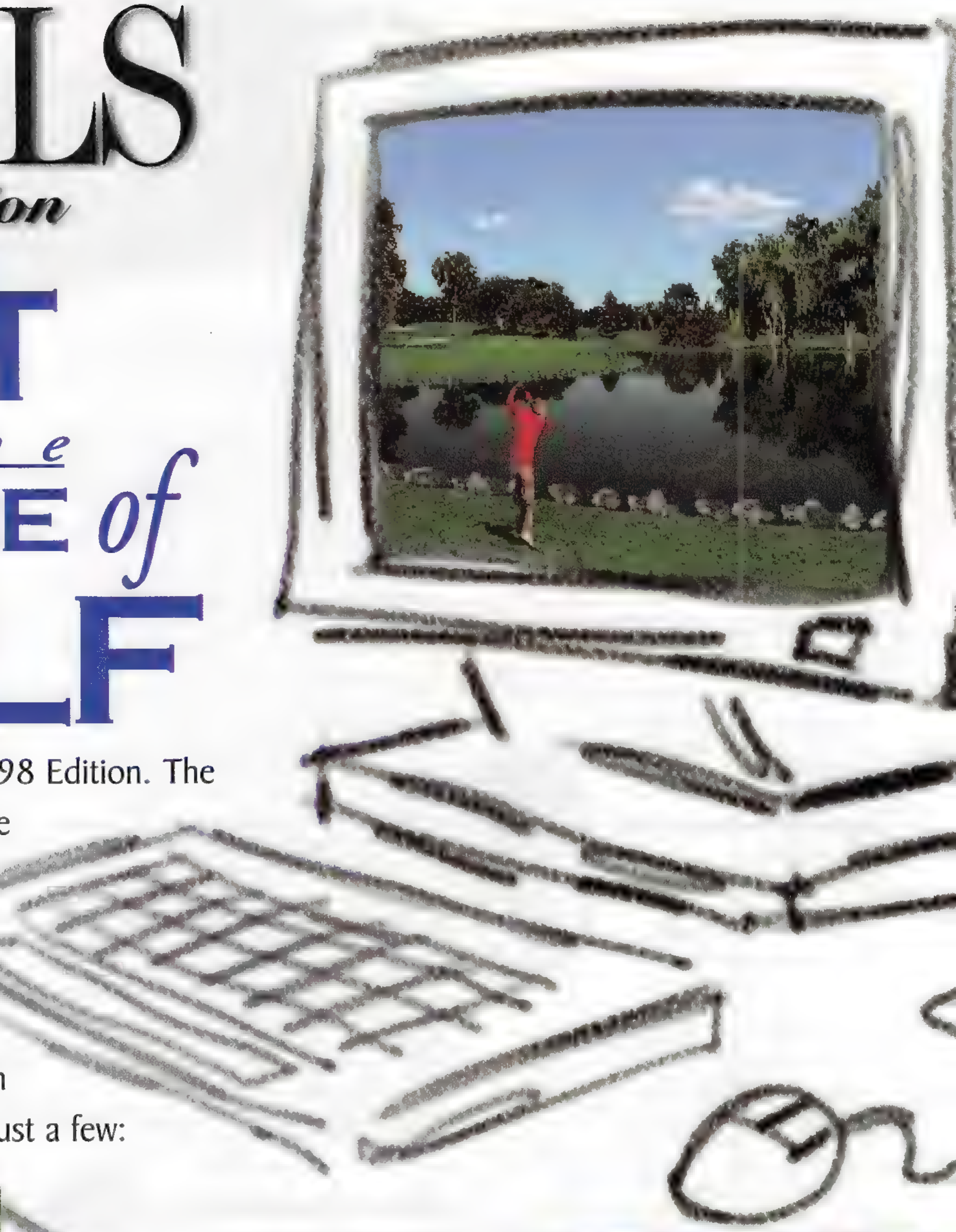
— *Andrew Sanchez*

boot verdict 9

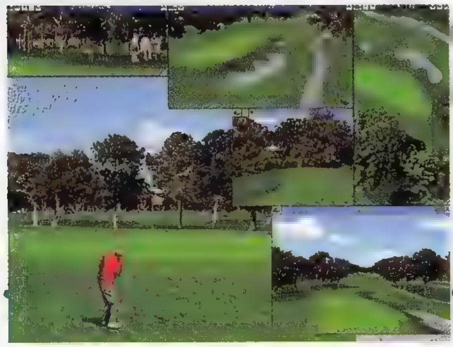
***Price** $99*
***Company** miro*
***Phone** 800.249.6476*
***URL** www.miro.com*

Links LS
1998 Edition

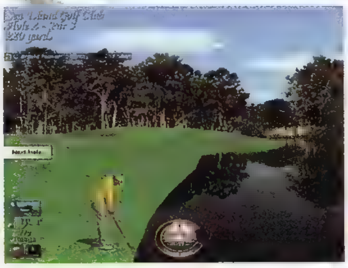
THE ART *and the* SCIENCE *of* GOLF



Introducing the Links LS 1998 Edition. The forces of art and science have combined to produce a golf experience like never before. This new version of the Codie Award winning golf simulation is packed with over 25 new features! Here's just a few:

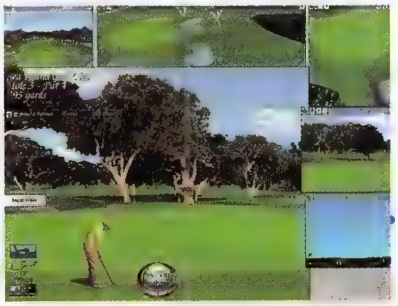


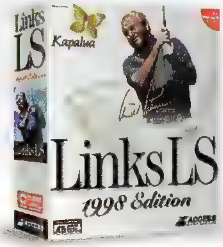
Brace yourself for lightening-fast redraws, main view in a window capability, and up to 8 additional "smart" camera views.



Our course designers have given even more attention to detail including new water reflections, improved textures and enhanced sky backgrounds.

Notice the new waving flags, birds, airplanes and other background animations with up to 8 of your friends over expanded internet play!





ACCESS SOFTWARE INCORPORATED

Phone Toll-Free 800.800.4880 • Fax 801.359.2968
Website–http://www.AccessSoftware.com
Available for the PC

Product Information Number 80

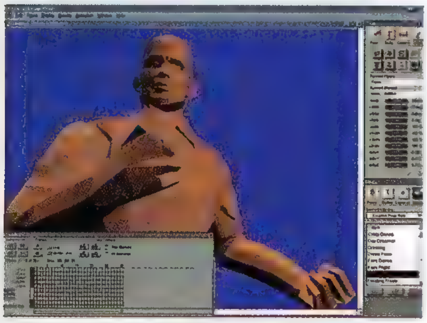
Poser 2

Strike a pose

boot KICK ASS! PRODUCT

Poser 2 falls in the exclusive category of software that, while not terribly practical for every user, is an unmitigated blast for anyone. Past candidates for this tag include MetaTools' *PowerGoo* and *Bryce2*. The latter title, a superb landscape generator/renderer would be an ideal companion for *Poser 2*, the sequel to Fractal Design's human-form modeler. Seeing that the companies merged to form MetaCreations, perhaps that will happen in the next revision.

The latest version of *Poser* takes up where the original left off and adds significant improvements. The library of mannequins has been expanded and the new models are much more life-like, with up to 10,000 polygons of detail. Both genders are represented in nude, casual, business, and skeletal states as both adult and child. External 3D objects can be integrated into the figures to create borgs, and intuitive, capable new animation features bring your creations to life.

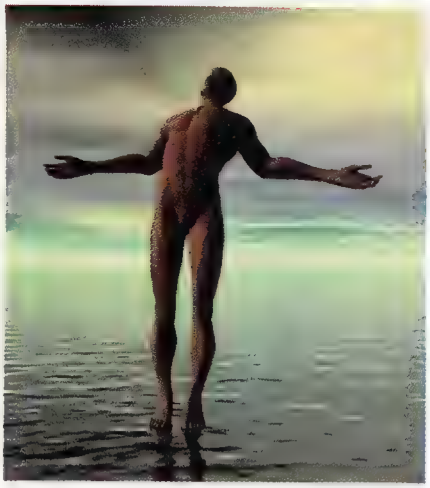


The animation controls (lower right) are sufficient for creating rudimentary movies of your star in action. Just make sure you have plenty of free scratch space on your hard disk for all the rendering.

Animation is as simple as designating keyframe poses and positioning the character in 3D space. *Poser 2* does all the tweening, using inverse kinematics to generate realistic movements that mimic those of a real human body. This ensures limbs don't bend in a circus-sideshow manner and you won't waste time re-rendering lousy animations.

To contort your creation, choose keyframes from the library of more than 75 poses, or manipulate figures manually using direct tools or numerically via an elaborate series of parameter dials. This last option is great for detail work and for moving the entire figure in space as your superhero streaks off into the distance.

Before you go all Chinese acrobat on your character, beware. Repeated wrenching of *Poser 2* models leads to bizarre deformations that can't be repaired except by starting with a fresh figure. The fender-bender-esque rumples that form in regions such as the butt cheeks after repeated leg rotations can't be smoothed out. This is an annoying glitch that should be fixed in the next version.

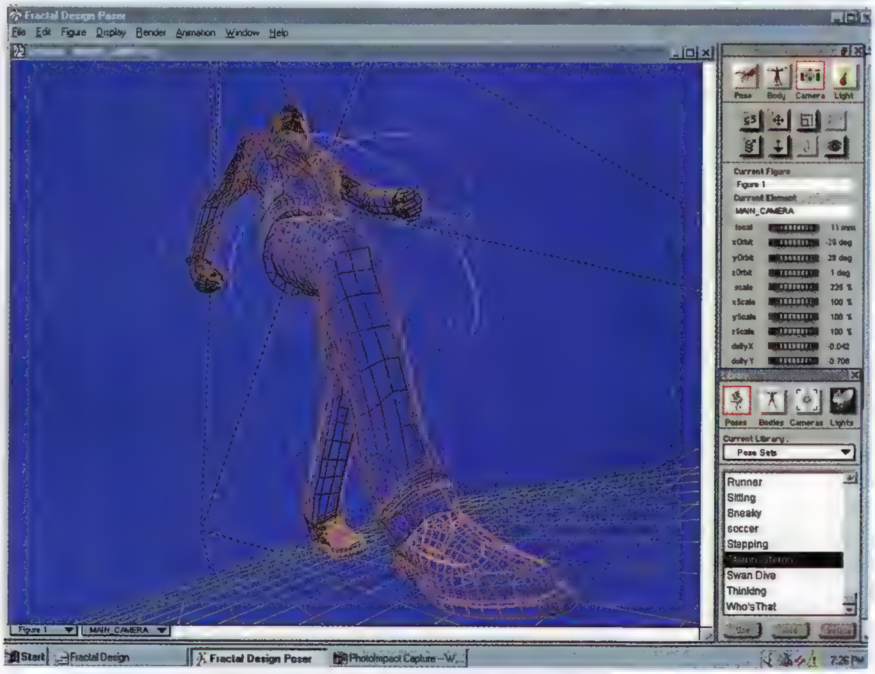


This sample image shows a *Poser 2* figure imported and rendered in a Bryce 2 environment.

You can have many characters on screen simultaneously for your own take on The Last Supper, and have the scene displayed with detail ranging from crude line boxes to lit wireframes to flat-shaded polygons, for smooth real-time posing—only the most anemic machines will ever need to reduce detail. When it's time to render, one of the supplied texture/bump maps can be applied or, if you're ambitious, make your own custom texture maps to wrap around your wireframes. Better yet, paint directly on the model with Fractal Design's *Detailer*.

Once you've created life in your own image, you'll want to take it out into the big bright world. Models can be exported in DXF, OBJ, 3DMF, *3D Studio* r4, and *Detailer* formats. Models lose many of their attributes such as texture and bump maps when exporting, especially when going into *3D Studio Max*. But this is a mixed blessing. Without a sophisticated texture generator, such as the one in *Bryce2*, the skins applied in *Poser 2* are nothing to cry about losing.

— Brad Dosland



Current Figure: Figure 1
Current Element: MAIN_CAMERA
focal 11 mm
xOrbit -29 deg
yOrbit 28 deg
zOrbit 1 deg
scale 235 %
xScale 100 %
yScale 100 %
zScale 100 %
dolly X -0.042
dolly Y 0.706
Current Library: Pose Sets
Runner
Sitting
Sneaky
soccer
Stepping
Swan Dive
Thinking
Who'sThat

Poser 2's interface is typical Fractal Design fare, with multiple floating palettes that give you control over the most intricate details.

Price ***$249***
Developer/Publisher
Fractal Design
Phone ***800.846.0111***
URL ***www.fractal.com***

boot verdict 9

Intergraph **TD-25**

RISC meets CISC in a gaming workstation

MEMORY MAXIMUS
Dual DIMM slots max out at 128MB of system RAM until someone designs larger DIMM modules.

Intergraph blazes into the home-PC market with its TD-25, combining Intel's newest P233MHz MMX processor with their own Vérité-powered Intense 3D 100 video card.

Accessing the TD-25's gears is a snap thanks to handy thumbscrews, and once inside, Micronics' Thunderbolt ATX form-factor motherboard provides the foundation. Armed with 512K of soldered-on L2 cache and Intel's 430TX PCIset, the SIMM-less motherboard comes with only two 168-pin DIMM slots for RAM expansion, and one is filled with a 32MB module. The chipset supports up to 256MB of system RAM, but technology limitations restrict upgrading to 128MB (via two 64MB modules). Micronics positioned the ZIF socket to the right of the ATX power-supply fan, robbing the P233MHz processor of valuable forced-air cooling. Two 3.5-inch and one 5.25-inch free drive bays give you enough room for that DVD drive you're eyeing.

USB connectors are integrated into the ATX I/O connector, unlike other systems that rely on a USB connector plugging up an expansion slot.

Three bus-mastered PCI, three ISA, and one shared slot round out the expansion-bus roll call, with two of the PCI slots filled by the Intense 3D and Ensoniq's AudioPCI sound card. General MIDI compliance and full Sound Blaster compatibility ensure higher-quality sonics than the OPL/FM synth crap we've grown accustomed to.

Other quality components abound, including Toshiba's XM-5702B 12x EIDE CD-ROM drive and Fujitsu's fast but small MPA3035AT 2GB EIDE hard drive. Intergraph's 17sd69 17-inch monitor handles the visual chores. The review system also came with a 3Com EtherLink III card, but no modem, although you can order one.

The optional NMB ConcertMaster Multimedia keyboard does triple duty as a keyboard, 3D-surround sound generator, and speaker system. With built-in microphone, SRS surround-sound enhancer, and mini-plugs for subwoofer outputs, the ConcertMaster is a thoughtful but thoroughly cheesy performer; the speakers distort when cranked beyond halfway. Get the plain-vanilla keyboard and opt for killer subwoofer/satellites.

Despite claiming to be a "gaming system," the TD-25 lacks peripherals such as a joystick, throttle, or game pad. Still, Intergraph did do their homework and properly set up their DOS-mode drivers.

Under the collective bootMarks, the TD-25 performed like a well-oiled .44 Magnum. Its bootMark score of 61 is faster than any previous Intel P200 MMX system we've tested, but slower than AMD's K6 233MHz processor (seen in Xi's latest machine, reviewed on page 76).

While Vérité detractors claim substandard Windows 2D performance, the Rendition performs on par with most 2D solutions. It may not have the speed-freak tendencies of a tightly optimized Matrox or Stealth 3D device driver, but for normal applications it's just fine. Win95 application performance was a hair under par, but hard-drive performance cruised at a brisk pace.

The Toshiba 12x CD-ROM spun at expected speeds, and VidTach only dropped 10.9% frames of AVI animation. With VESA 2.0 support hard-wired to the flash-upgradable video BIOS (wow, what a concept!), the Intense 3D 100's core RISC processor worked overtime during our *Quake* benchmark, posting a solid 16.3fps. But if you're playing unaccelerated *Quake* on a Rendition Vérité, you should be whipped. With *VQuake* engaged, we clocked in a cool 26.8fps at 640x480 and an ultrasmooth 34.2fps at 512x384 resolution. DirectX performance was right in the sweet spot, while Direct3D performance was solid, with *Terracide* averaging 24fps. FMV and MPEG playback was good, but still a lil' chunky.

Although the multimedia keyboard strayed off its target and the lack of gaming accessories left us feeling unarmed, Intergraph's TD-25 is a great place to start your own killer gaming system.

— *Andrew Sanchez*

under the hood

THE BRAINS

CPU	Intel P55C 233MHz MMX
L2 Cache	512K pipeline burst (512K maximum)
RAM	32MB EDO-DRAM DIMM (128MB maximum)
Video	Intergraph Intense3D 100 w/4MB EDO-DRAM (Rendition Vérité V1000E)
Motherboard	Micronics Thunderbolt ATX

THE BRAWN

Hard Drive	Fujitsu MPA3035AT 2GB EIDE
CD-ROM	Toshiba XM-5702B 12x EIDE CD-ROM drive
Expansion Bus	Three PCI (two occupied); three ISA; one PCI/ISA shared
Fax/Modem	None
I/O Ports	Two USB; two serial; one parallel
LAN	3Com EtherLink III ISA 10BASE-T

THE BEAUTY

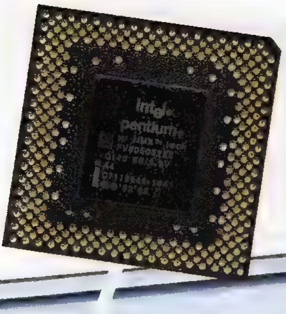
Display	Intergraph 17sd69 17-inch monitor, 1280x1024/16-bit @ 60Hz
Sound	Ensoniq AudioPCI
Speakers	Integrated 2+2 watt speakers in keyboard
Other	NMB ConcertMaster Multimedia keyboard w/SRS 3D Sound

EXPANSION MAP

PCI	Free
PCI	Intense 3D 100
PCI	Ensoniq AudioPCI
PCI	Shared
ISA	Ethernet card/shared
ISA	Free
ISA	Free

THE BUNDLE Windows 95 OSR/2 ❙ Rendition Vérité Quake patch ❙ Quake shareware ❙ Intergraph Gaming CD, including: Indy Car Racing II (Rendition) ❙ Monster Truck Madness ❙ Hellbender

boot	down
:52	:06



HEAVY ARTILLERY

Intel, alongside AMD, breaks the 200MHz speed limit with its 233MHz processors. AMD's K6 is strong, outgunning Intel's CPU in almost every benchmark except floating-point-intensive processing.

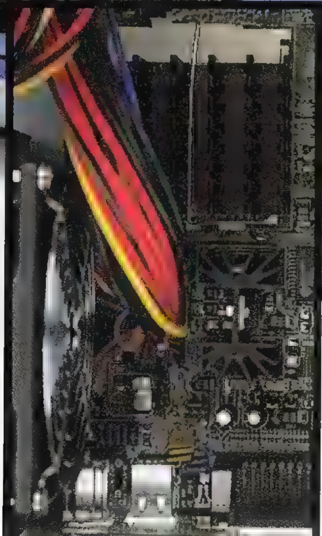
If you're thinking of slapping this Pop-Tart in your ZIF socket, check with your motherboard manufacturer to ensure your board can take it.

DOORWAY TO DRIVES

If you don't dig the Integraph security door, just snap it off.

MASTERS OF A ONE MAN BAND

Sitting at the top of the NMB ConcertMaster keyboard are all the controls. Do yourself a favor and keep the SRS off—while it slightly widens the soundstage, it totally kills your center imaging. Better yet, nix this multimedia mess and get a regular ol' keyboard and splurge on some serious speakers.



A LITTLE TO THE RIGHT

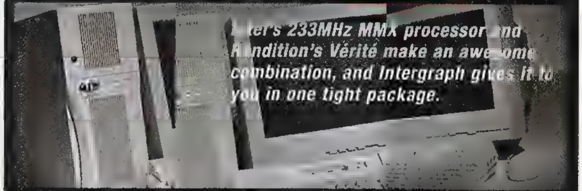
Micronics decided that the power supply's Molex connector deserves more cooling than the CPU. Pity.

Intergraph

TD-25

real-world benchmarking

Test	Benchmark	Unit	Result
CPU/MOTHERBOARD	*bootMark*		61
WIN95 APPS	*SYSmark32*		165
DIRECT 3D	*Terramark*	composite	441
HARD DRIVE	*Adaptec ThreadMark v1.0*	MB/sec	3.30
CD-ROM	*CD Tach/Pro v1.65*	K/sec	1868
WIN95 VIDEO	*VidTach v1.52*	% played	89.1
DOS GAMING	*Quake v1.06*	fps	16.3
DIRECTX GAMING	*MDK PerfTest v1.4*		92
MMX PROCESSING	*DeBabelizer Pro*	secs	320
CPU/DISK	*Microsoft Visual C++ compile*	secs	171



Intel's 233MHz MMX processor and Rendition's Vérité make an awesome combination, and Intergraph gives it to you in one tight package.

+

- Intel P55C 233MHz MMX processor
- Intergraph Intense 3D 100 (Rendition Vérité V1000E)
- VESA 2.0 support in BIOS
- Excellent Direct3D support
- Ensoniq AudioPCI sound card
- Vérité *Quake*
- DOS-mode drivers properly installed

−

- No gaming controllers
- Average Win95 application performance
- Cheesy optional keyboard
- Substandard speakers on optional keyboard
- No modem

Price *$2,908*
Company *Intergraph Computer Systems*
Phone *800.763.0242*
URL *www.intergraph.com*

boot verdict 8

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

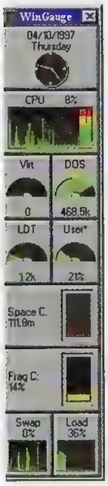
Nuts & Bolts

Hardware for your hard drive

TRY IT ON THE DISC

Like a virtual toolbox, *Nuts & Bolts* has the tools to repair and prevent the Win95 problems that plague us daily. Helix (maker of *Netroom* and *Hurricane*) is taking on *Norton Utilities* and *First Aid 97* with this suite of 17 utilities. Included are system enhancers such as Launchpad (which keeps apps close at hand), WinGauge (a real-time graphic system tracker), and Zip Manager (with ubiquitous ZIP capabilities). These can be accessed individually or from the *Nuts & Bolts* Control Center. The suite's strength is its balance of wizards to help novices with complex tasks, and advanced options for power users.

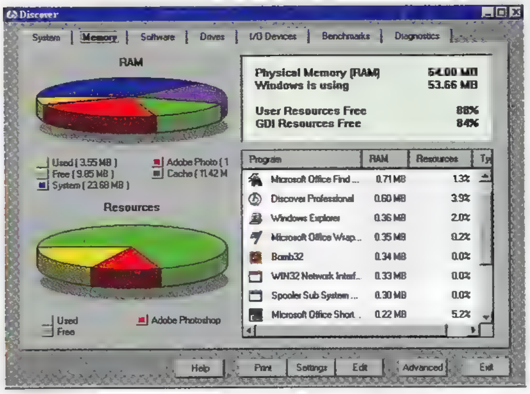
Bomb Shelter, the backbone of *Nuts & Bolts*, resides in the bowels of Win95, catching problems other utilities may miss. Catching errors before they corrupt files protects components such as the VMM (Virtual Memory Manager) and other Virtual Device Drivers (VxDs), plus Windows' User, Kernel, and GDI modules. It can even protect the first 1MB of RAM, at the cost of slower system performance. Bomb Shelter caught the majority of crashes we tossed at it, allowing recovery of the OS in most cases—the exception being some DirectX problems, which it either didn't detect or didn't have time to stop, all resulting in the system locking up.



04/10/1997
Thursday
CPU 8%
Virt 0
DOS 468.5k
LDT 12k
User* 21%
Space C: 111.9m
Frag C: 14%
Swap 0%
Load 36%

Keep track of memory usage, swap-file use, virtual memory, hard drive space, and other aspects of your system with WinGuage. The look and type of gauge are also customizable.

Stronghold handles encryption using either the DES, Triple DES, or 160-bit to 448-bit Blowfish algorithm, randomly scrambling data prior to encryption for more secure results. Working with Zip Manager, Stronghold encrypts, ZIPs, and sends password-protected messages. For more security, Shredder permanently erases files by immediately writing over deleted files and wiping the directory entry and the long file name, even on compressed drives.



Physical Memory (RAM) 54.00 MB
Windows is using 53.66 MB

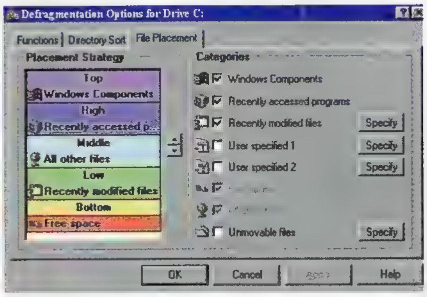
User Resources Free 88%
GDI Resources Free 84%

Used (3.55 MB)
Free (9.85 MB)
System (23.68 MB)
Adobe Photo (1
Cache (11.42 M

Program	RAM	Resources
Microsoft Office Find ...	0.71 MB	1.3%
Discover Professional	0.60 MB	3.9%
Windows Explorer	0.36 MB	2.0%
Microsoft Office Wrap...	0.35 MB	0.2%
Bomb32	0.34 MB	0.0%
WIN32 Network Interf...	0.33 MB	0.0%
Spooler Sub System ...	0.30 MB	0.0%
Microsoft Office Short .	0.22 MB	5.2%

Used
Free
Adobe Photoshop

***Nuts & Bolts'* Discover Pro utility provides complete system info so you know where your PC stands at all times.**



Top
Windows Components
High
Recently accessed p...
Middle
All other files
Low
Recently modified files
Bottom
Free space

☑ Windows Components
☑ Recently accessed programs
☑ Recently modified files
☐ User specified 1
☐ User specified 2
☐ Unmovable files

Other utilities will reorder the contents of your hard drive, but few let you customize file placement. DiskTuner gives you that control.

System repair and maintenance is handled by Cleanup, which locates and ZIPs, deletes, shreds, or moves unneeded files to another drive or the Recycle Bin. The utility called Image/Restore creates backups of critical information such as your boot records, partition tables, and file-allocation tables. It can then recover a disk image if the original file has been moved or if the partition table and boot sectors have been wiped out.

The suite's most powerful utility, DiskTuner, is a defragmenter that speeds up the hard disk. In our tests it defragmented much faster than Norton Utilities or the decrepit *Scandisk*, and you can customize file placement on your hard drive, placing frequently accessed files at the front and recently modified files near the free space. A glitch that repeatedly restarted the scan has been addressed in the 1.01 update, but, unfortunately, you can't automatically update DiskTuner via the interface as you can with *Norton Utilities*' LiveUpdate feature.

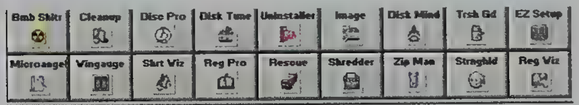
Nuts & Bolts can also rebuild and optimize the Registry for maximum performance—something no other suite offers. The package is gracefully rounded out by Discover Pro, Helix's venerable diagnostic and benchmark app, which lists every detail about your PC's hardware and software. Currently running software and memory can be tracked in real time, and drives and I/O devices can be diagnosed for problems and failures. A free version of Cheyenne's AntiVirus scanner is also included.

Nuts & Bolts is an indispensable tool for keeping your machine humming.

— *Sean Cleveland*

What You'll Find in a Pile of Nuts & Bolts

- *Launchpad* (Win 3.1x and 95) Launches programs, documents, and folders.
- *Bomb Shelter* (Win 3.1x and 95) Protects against overwriting.
- *Cleanup Wizard* (Win 3.1x and 95) Finds duplicate, old, and unused files to delete, compress or move.
- *Discover Pro* (Win 3.1x and 95) System info with diagnostics and benchmarks.
- *DiskTuner* (Win95) Defragments disk space.
- *Image/Restore* (Win 3.1x and 95) Saves an "image" copy of critical disk info.
- *DiskMinder* (Win 3.1x and 95) Diagnoses and repairs disk problems.
- *TrashGuard* (Win95) Protects deleted files.
- *EZ Setup* (Win95) Customizes the desktop and startup.
- *WinGauge* (Win 3.1x and 95) Graphically tracks system memory, resources, and performance in real time.
- *Rescue Disk* (Win 3.1x and 95) Creates a boot disk for disk recovery.
- *Shortcut Wizard* (Win95) Locates orphaned shortcuts and repairs or deletes them.
- *Registry Pro* (Win95) Manually edit and repair Registry database.
- *Shredder* (Win 3.1x and 95) Permanently deletes files and "security wipes" free disk space.
- *Zip Manager* (Win 3.1x and 95) Compresses ZIP files and unzips existing ZIP files.
- *Stronghold* (Win 3.1x and 95) Encrypts sensitive files.
- *Registry Wizard* (Win95) Troubleshoots the Registry database.



Launchpad is a simple, convenient way of getting to those applications that can be easily hidden by dialog boxes. Just drag an icon to the Launchpad to add more shortcuts.

Price $50
Company Helix
Phone 800.451.0551
URL www.helixsoftware.com

boot verdict 9

MEDIAMASTER™

CD-REWRITABLE TECHNOLOGY

74
CD-RW
MP6200S
RICOH

Dual Function CD-ReWritable Drive CD-Recordable Drive

- Internal Design
- SCSI-2 Interface
- Write 2X/Read 6X
- Dust Free Design
- For Windows 95®
- Includes CD-RW and CD-R Media

"It works for me."

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Jamie
Graphic Designer

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MIS Manager

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Brad
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Janet
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RICOH®

Product Information Number 291

Theme Hospital

Turn your head and cough

TRY IT ON THE DISC

Despite the bedpan humor, *Theme Hospital* is a challenging, addictive, and occasionally funny sim that deserves to be taken seriously. Starting with an empty building, seen from above in isometric perspective, your task is to build and run a functioning hospital. Helping considerably in your task are crisp SVGA graphics and an intelligent, if somewhat idiosyncratic, user interface.

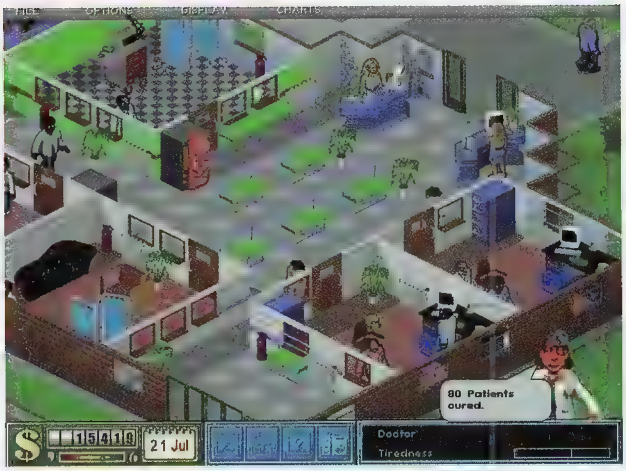
The simulation is cartoon-simple but logical. The receptionist admits patients, the doctor diagnoses them, and the nurse gives them pills in the pharmacy. Later, you can add specialized treatment rooms to handle such deadly ailments as Bloaty Head and Slack Tongue.

High frames of animation add lively character motion to doctors playing pool in the staff lounge or having a sit-down in the lavatory. It's like watching 3D cartoons come to life with highly detailed interactions such as doctors deflating Bloaty Head victims and patients tucking themselves in. The Win95 implementation is impeccable—it even allows clean Alt-Tab task switching.

In contrast to open-ended simulations such as *SimCity*, *Theme Hospital* is broken into discrete levels, each completed when you've amassed specified amounts of cash assets and reputation. Success depends on both management strategy and real-time control of individual characters.

Complaints? There are only eight Save slots. And you lose your current hospital design at the end of each level. Multiplayer support isn't implemented with the shipping game, but will come later with an upgrade that will allow up to four players to run rival hospitals.

— *Frank Lenk*



Theme Hospital **depicts hospital activities in a clear, friendly overhead view.**

CHECKLIST

Maximum Resolution/Color
640x480/8-bit
Win95 Native
MS DOS
DirectX
DirectDraw DirectSound

Price ***$50***
Developer ***Bullfrog Productions***
Publisher ***Electronic Arts***
Phone ***800.245.4525***
URL ***www.bullfrog.co.uk***

boot verdict 8

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Ricoh	95	291	www.ricoh.com
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Sejin America	86	306	www.sejin.com
STB Systems	28	307	www.stb.com
Take 2 Interactive	100	120	www.take2games.com
VideoLogic	15	340	www.videologic.com

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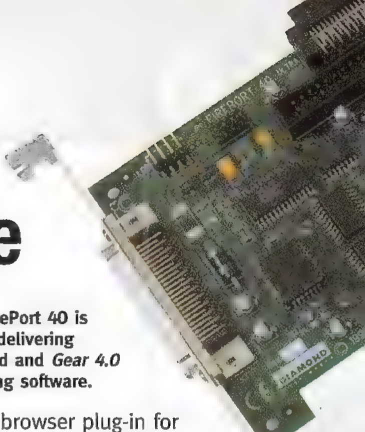
boot

Diamond **FirePort 40** PCI **Ultra Wide**

Obliterate the I/O bottleneck



Diamond's FirePort 40 is a contender, delivering extreme speed and *Gear 4.0* CD-R mastering software.

Extreme speed is what Ultra Wide SCSI promises, and the Diamond's FirePort 40 delivers, with transfer rates spec'd at up to 40MB/sec and bursts reaching a mind-blowing 133MB/sec through bus-mastered PCI slots.

But can Diamond deliver a worthy challenge to Adaptec? Look at the numbers. They're totally on par. This is largely the result of how the card is seamlessly bound to the OS and how well the drivers are implemented. The DOS and Win95 drivers guarantee compatibility with full ASPI compliance. In fact, we never had to reformat a hard drive when swapping out a pre-existing Adaptec card. Installing NT 4.0 from a SCSI CD-ROM drive was a breeze and integrating into an existing NT machine was just as simple and error-free.

A Symbios Logic 53C875 RISC-based SCSI I/O processor powers the FirePort 40. In addition to 50-pin (SCSI-2) and 60-pin (SCSI-3) internal connectors, a 50-pin external connector can be added with the External Wide SCSI Upgrade Kit to SCSI-3 (available separately). No jumpers are used and all configuration settings are made within graphical BIOS screens. Termination is active, requiring no manual configuration, and the BIOS is flash-ROM upgradable.

One reason to add a SCSI card to your PC is for burning CD-Rs. FirePort's bundled software includes the Kick-Ass award–winner *Gear 4.0* CD-R mastering software, and *WebGrabber*, a browser plug-in for copying files directly from the Internet to CD-R, which earned a miserable bootVerdict of 3 in *boot* 04.

After using the FirePort 40, we won't be putting the 2940UW back in the *bootDisc* burn station.

— Sean Cleveland

Price *$200*
Company *Diamond*
Phone *408.325.7000*
URL *www.diamondmm.com*

boot verdict 9

Dare to Compare

SCSI CARD TEST	DIAMOND FIREPORT	ADAPTEC 2940UW	DIAMOND FIREPORT	ADAPTEC 2940UW	DIAMOND FIREPORT	ADAPTEC 2940UW	DIAMOND FIREPORT	ADAPTEC 2940UW
SCSI Topology	**Ultra Wide SCSI (Hard Drive)**		**Wide SCSI (Hard Drive)**		**Fast Narrow SCSI (Hard Drive)**		**Narrow SCSI (CD-ROM)**	
Type of Drive	**Quantum XP34300W**		**Seagate ST3437W**		**IBM DPES-31080**		**Toshiba (15x) XM-3801TA**	
SCSI Bench								
Random I/O (64K)	2330	2320	2543	2677	1763	1730	450	446
Sequential I/O (64K)	6204	6340	8585	8589	4129	4184	1565	1606
Same Sector I/O (64K)	14684	15764	7705	7729	8827	8810	849	1007
Adaptec Threadmark								
Transfer Rate (MB/sec)	4.77	5.49	4.16	4.83	2.14	2.24	NA	NA
CPU Utilization	33%	37%	45%	47%	24%	41%	NA	NA

Outlaws

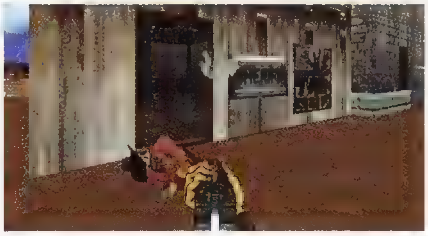
A fistful of pixels

TRY IT ON THE DISC

With six-shooter in hand and rifle slung over shoulder, you seek righteous vengeance on the lowlifes responsible for burning your farm, killing your wife, kicking your dog, and lowering your frame rate. Welcome to the dusty realm of *Outlaws*. A stylish spaghetti western of a game that has little going for it except the LucasArts name.

If only the game looked as good as the *Wild Wild West*–inspired cut scenes. It's a shame it doesn't, because *Outlaws* adds 3D polygon objects, sloped ceilings and floors, shattering windows, underwater sections, and higher resolutions to the JEDI engine. It even has sector stacking with breathtaking vistas in outdoor levels.

Start with low-resolution texture maps (64x64 on average), add to that laughable 100x50 pixel sprites and a paltry lack of frames-of-animation (resulting in stilted movement and two-frame animations for weapon reloads), and you have some of the worst graphics ever seen in a first-person shooter.



***Outlaws* proves that no amount of cinematics can hide substandard in-game graphics.**

Despite the anemic look, frame rates are downright feeble. On a stock P200, the pixelicious 320x200 burns more than 35fps, but upping the pixel count drops the frame rate dramatically. A 640x480 res trudges along at 13fps to 18fps, and 800x600 drops to a shoddy 8fps to 13fps.

Still, *Outlaws* features strong gameplay, and, unlike most first-person shooters, you aren't nigh invulnerable. Take a slug in the forehead. Game over. Running blindly into the unknown is a shortcut to a dirt nap. Realize this, and gunfights become more of a duck-and-cover affair, with pixel-perfect shooting accuracy keeping you from meeting your maker. The rifle-mounted scope ensures that you'll be creepin' 'round corners and picking off hombres from a safe distance whenever possible.

With a Direct3D/Voodoo patch promised, *Outlaws* may sidestep its substandard graphics and successfully saddle an in-depth plot with furious six-shooter gunplay. As it stands, all the cinematics in the world can't save *Outlaws* from hangin' high.

— Andrew Sanchez

CHECKLIST

Maximum Resolution/Color
800x600/8-bit

DirectX
DirectDraw DirectSound
DirectPlay

Multiplayer
LAN Modem Serial
Internet Gaming Zone Kali

Price *$50*
Developer/Publisher *LucasArts*
Phone *800.985.8227*
URL *www.lucasarts.com*

boot verdict 4

Yamaha **CDR400tx**

Burning new ground

boot KICK ASS! PRODUCT

Yamaha, we need to talk. The CDR400tx you sent us for evaluation isn't coming back. We know we agreed to keep the drive only long enough to benchmark it, but it's the flat-out best CD-R drive to come through the bootLab. By the time we nicknamed it Tex we knew you'd never see this drive again. We hope you understand.

You should have known this would happen when you sent us a drive with 4x Write/6x Read performance and UDF-compliant, variable packet writing, which is rigged with a 2MB buffer and is fluent in the seven major CD formats (CD-ROM, CD-DA, CD-ROM/XA, CD-i, CD-Extra, and Video CD).

The CDR400 series makes it damn tough to burn a tosser. For the record, it's an external drive of the tray variety, with a handy headphone jack sporting volume control in the front and two RCA audio-out jacks in the back. A switch, located below the two SCSI-II type connectors in the back, handles termination. Although the drive comes bundled with Adaptec's *Easy-CD Pro 2.1* and *DirectCD* (see below), we successfully notched platters with both *Creator 2.0* and *Gear 4.02* as well (although *Gear* didn't recognize packet writing).

What pushed the CDR400tx beyond the realm of serviceable into the pry-it-from-our-white-knuckled-hands category is its new packet-writing technology called RapidLinked. Using both variable and fixed packet-writing techniques, RapidLinked packets deliver higher-performance data transfer. Instead of writing physical run-out blocks and link blocks at the end of each packet (as the standard goes), RapidLinked packets write a logical run-out and link. Because the link is logical, the drive doesn't waste time rereading the physical run-out and link blocks of the last packet before it writes the new one. This method allows the CDR400tx to write a packet disc at nearly 4x.

In addition to outperforming any other CD-R drive we've benchmarked, the CDR400tx's rich feature set and external accouterments make it a keeper.

— *Sean Downey*

boot verdict 9

Price $860
Company Yamaha
Phone 800.543.7457
URL www.yamahayst.com

DirectCD **is not a component of DirectX 5.0, but it's turning up as part of Windows 98.**

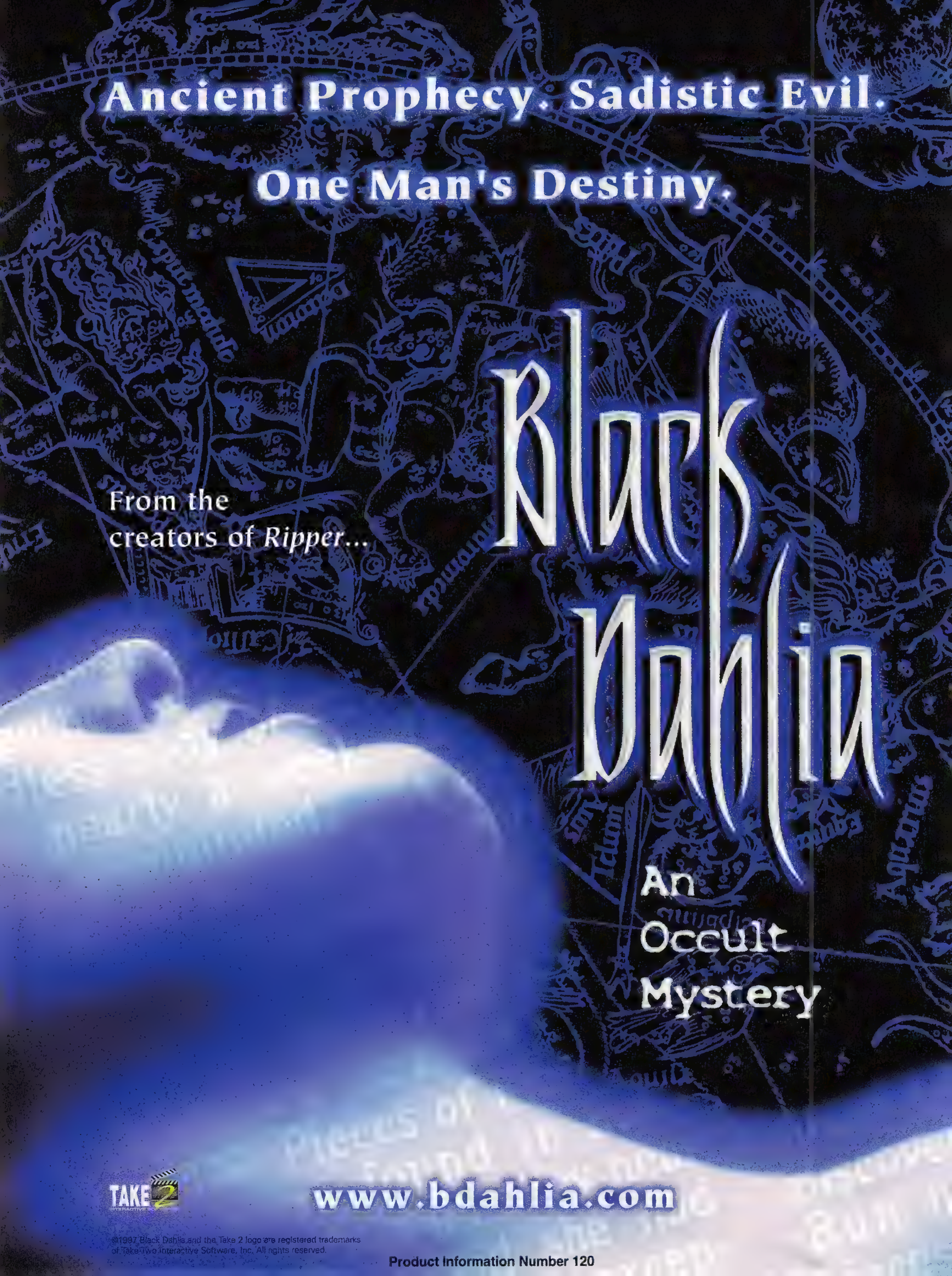
Dare to Compare

	PHILIPS CDD 2600	YAMAHA CDR400TX
BUNDLE	Adaptec 1535 SCSI adapter w/ *EZ-SCSI 4.0, Seagate Backup* and *CD Creator 2.0*	Adaptec *Easy-CD Pro 2.1* and *DirectCD 1.01s*
On the fly torture test (mins)	18	8
Create 390MB ISO image file (mins)	13	11
Burn 390MB ISO image file (mins)	25	13
Packet Writing (500MB) (mins)	46	16

DirectCD

For a long time now, CD-R's special care and feeding have made it the four-eyed geek at any removable-storage gathering. Other random-access drives laughed at CD-R's dependence on special mastering software to copy even the slightest text file to disc. They aren't laughing any more. New CD-Rs have been made over with *DirectCD* packet-writing software. Your CD recorder is finally coming out and joining the rest of your random-access drives.

DirectCD is the new CD-UDF compliant packet-writing software from Adaptec that offers the same drive-letter access when writing to your CD-R that you enjoy with your hard drive and floppy. Now you can drag and drop files in *Explorer* or use the Save As command in applications such as *Word* or *Navigator* to permanently burn them to disc. When you eject the disc, *DirectCD* gives you an option to finalize the disc in ISO 9660 Level 3 format so other CD-ROM drives can read it, or to leave it in UDF format so you can add to it later. CD-UDF is the new standardized CD format that promises the ability to share discs across CD-ROM, CD-RW, and DVD.



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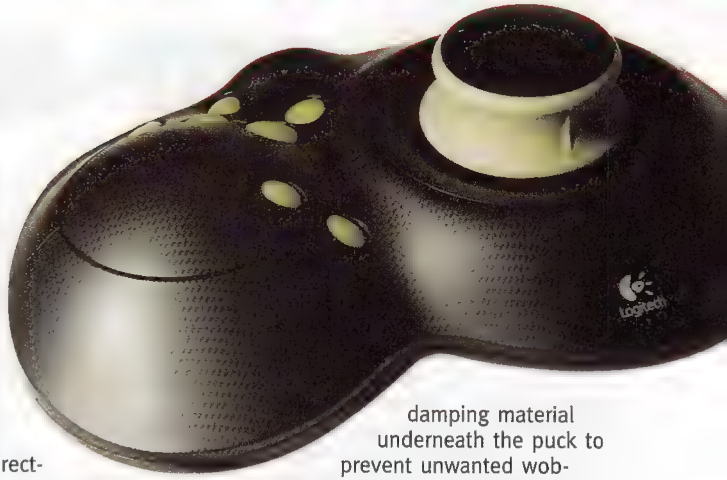
Product Information Number 120



CyberMan 2

Better than the first

A couple of years ago, Logitech gave a CyberMan controller to everyone attending their party at the Computer Game Developers Conference, hoping developers would support the device in upcoming titles.

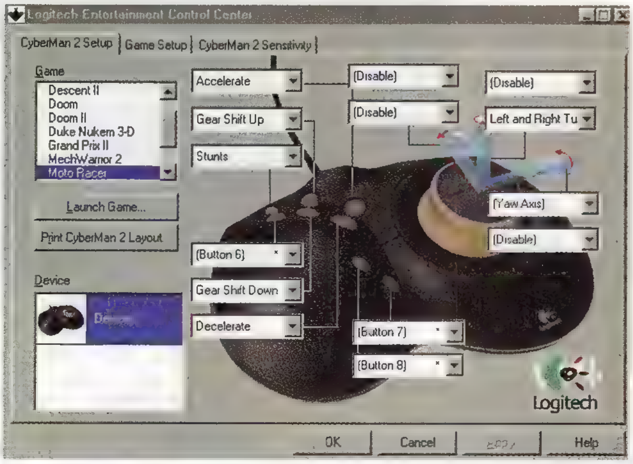
Their plan didn't work.

The CyberMan sucked due to its unintuitive control, lame tactile feedback, and poor technical implementation. After licking its wounds, Logitech tries again with a Win95-only controller aptly named the CyberMan 2.

Much like the original, the CyberMan 2 offers 6 degrees of freedom—standard movements on the *x*, *y*, and *z* axes plus roll, pitch, and yaw—via the huge puck located in the center of the controller. Make no mistake, the CyberMan 2 requires a substantial amount of desk space and two free hands.

The CyberMan 2 is fully digital, using a combination of light diodes, slit blinds, and photoreaders for precise optical measurements. Light is beamed from the diode through the slit blind to a photoreader. These readings (or measurements) are mathematically processed in a matrix, resulting in extremely accurate positioning. Because of the digital operation, the CyberMan 2 doesn't require calibration and won't wear out (unlike analog controllers with potentiometers).

The eight buttons on the base can be mapped for various game commands or single keystrokes. Unfortunately, you can't assign macros or cheat codes. You can, however, assign keystrokes to any or all of the axes.

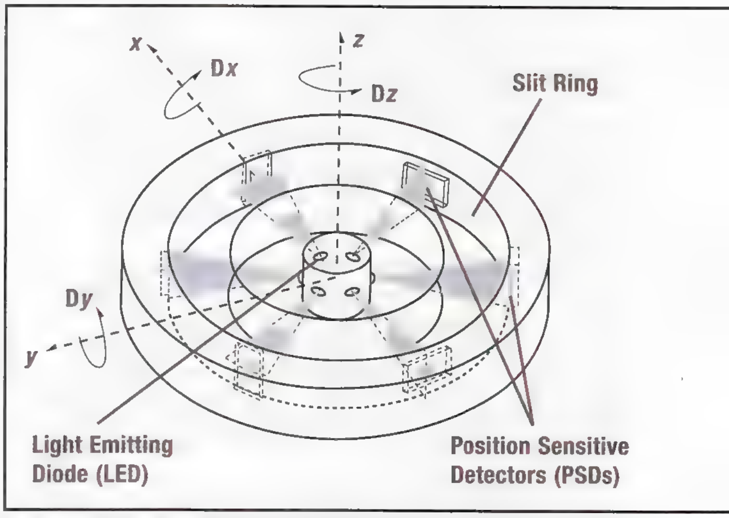

Logitech Entertainment Control Center
CyberMan 2 Setup
Game Setup
CyberMan 2 Sensitivity
Game
Descent II
Doom
Doom II
Duke Nukem 3-D
Grand Prix II
MechWarrior 2
Moto Racer
Launch Game...
Print CyberMan 2 Layout
Device
Accelerate
Gear Shift Up
Stunts
(Button 6)
Gear Shift Down
Decelerate
(Disable)
(Disable)
(Button 7)
(Button 8)
(Disable)
Left and Right Tu
(Yaw Axis)
(Disable)
Logitech
OK
Cancel
Help

The CyberMan 2 ships with about a dozen game control sets, or you can download and import new ones from Logitech's web site.

The CyberMan 2 offers unmatched customization and adjustments. Very impressive.

The programming interface is top-notch, affording complete control over most of the CyberMan 2's functions. You can launch games directly from the control center and creating new game sets takes mere minutes (you can also print them for reference). Despite the macro limitations, you can assign keyboard modifiers and turbo-fire, and you can even switch around the axis assignments—a handy feature for driving games such as *Moto Racer* and *Grand Prix II*. If you reassign the *x*-axis (or what's commonly known as left and right movements) to the yaw position (or twist), you can control the bike or racing car by gently spinning the puck left or right, in effect creating a pseudo steering wheel. Other game functions, such as look up or down and sliding, can be assigned to the pitch and roll, respectively. You can also customize the speed and acceleration of the individual axes', and adjust the dead zone and overall filtering effects.

The base of the unit is constructed primarily of straight ABS plastic with cubic printing (the puck exterior has a rubber coating). The eight buttons are actually microswitches and, while they are noisier than their rubber brothers, they do provide resounding tactility. There's also damping material underneath the puck to prevent unwanted wobbling—and in case you were wondering, the *X-Files*-esque color scheme doesn't glow in the dark.


x
Dx
z
Dz
Slit Ring
Dy
y
Light Emitting Diode (LED)
Position Sensitive Detectors (PSDs)

The CyberMan 2 is fully digital. Its complex-looking optical system allows quick and precise movements.

If you're not used to playing games in the extra dimension, you'll need substantial prep time with this baby. While it's not a complicated controller, it is very complex. Mastering control of the yaw, pitch, and *z*-axis isn't easy, but can be accomplished with a few hours of gameplay.

The CyberMan 2 isn't designed for flight games, and with virtually no play on the puck, it isn't recommended. But with excellent construction and its impressive, in-depth interface, the CyberMan 2 is most innovative.

—Bryan Del Rizzo

Price *$99*
Company *Logitech*
Phone *800.231.7717*
URL *www.logitech.com*

boot verdict
8

UPPER RIGHT PHOTOGRAPH BY GABRIELLE REVERE

Micro X **MXP-5000**

Solid Gold dancer

Reading through the list of components in the MXP-5000 is like perusing the back of a greatest hits album. Among the collection of yesterday's chart toppers—such as the Matrox Millennium and the U.S. Robotics Sportster Vi—are hot new singles such as the Ensoniq AudioPCI and the Quantum Fireball ST. Unfortunately, B-sides such as Goldstar's 16x CD-ROM drive and the Mag Innovision DX700T keep this collection from going gold.

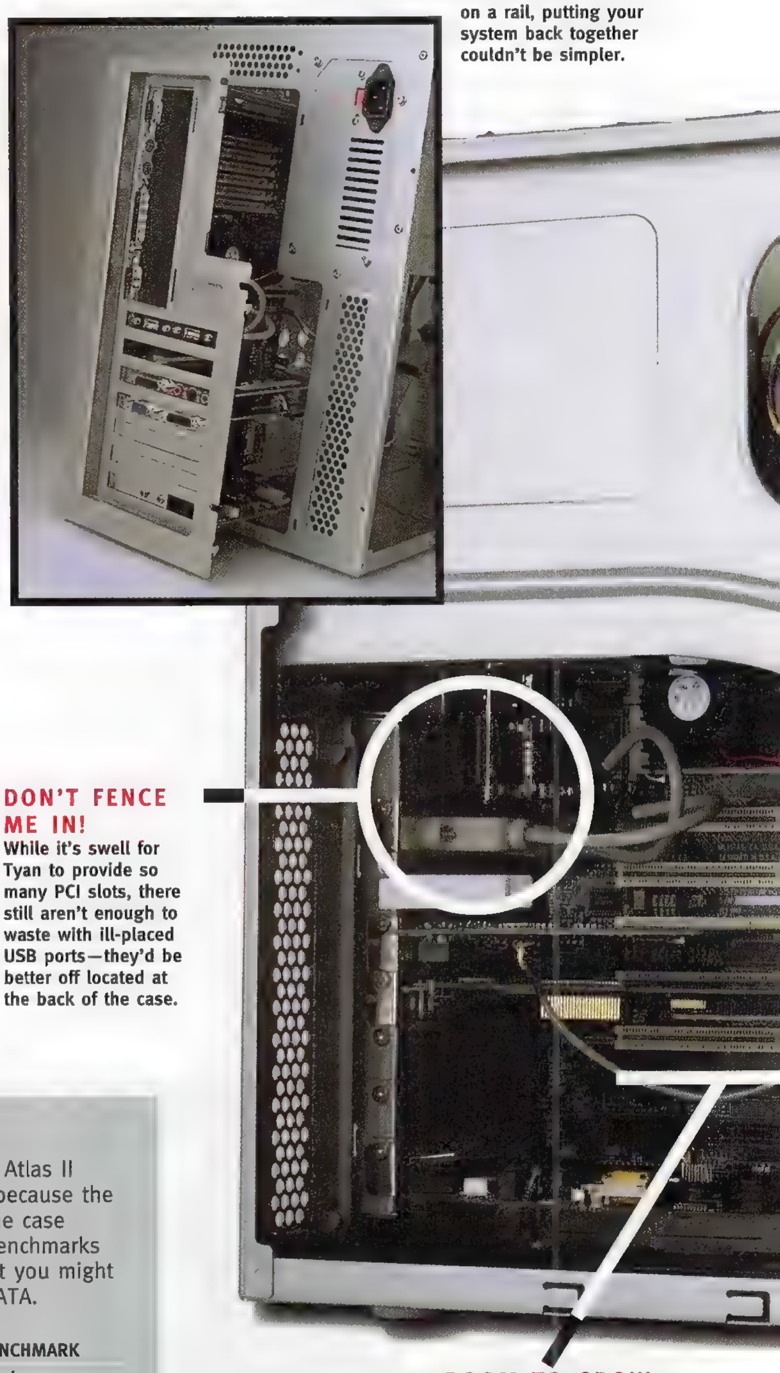
With Intel's 430TX chipset and 512K of pipeline burst L2 cache, Tyan's S1572 ATX motherboard is a definite crowd-pleaser. It features four bus-mastered PCI slots, two ISA slots, and one shared PCI/ISA slot. One of the two DIMM slots is filled with a 32MB stick and six SIMMs lie open. The remarkably clutter-free case antes up two 5.25- and one 3.25-inch bays for future expansion.

What really drives the performance of the MXP-500 is the new ultra ATA Quantum Fireball ST. Touting a bus-rattling 33MB/sec throughput using the new Ultra DMA/33 spec, the drive's burst rate is awe inspiring. The 3.8MB/sec sustained throughput doesn't inspire the same admiration, but it's among the highest we've pulled from any Win95 system. IDE hard drives still have a way to go before they match the throughput of their SCSI cousins (see below).

The Matrox Millennium cranks out 1280x1024 pixels at 32-bit color depth. Unfortunately the limp shadow-mask display of the Mag Innovision inflicts eyestrain with a 60Hz refresh rate at this setting. The contrast and colors on the DX700T are muddied and murky. The brightness and contrast had to be cranked to squeeze some vibrancy out of the display. It's sad to see a monitor so woefully overwhelmed by its video card. Micro X should leave the Mag Innovision at the docks.

The MXP-5000 is an excellent leg-up toward a kick-ass system. Its easily accessible case design has room to grow into, and the top-notch components such as the Millennium and Fireball ST will have you on your way to chart-topping performance.

— Sean Downey



EASY ACCESS REAR ENTRANCE
For those who are never done fiddling with their system comes a case design *made* for easy access. Undo a few screws and a gentle tug slides the motherboard and all her accouterments out the back. Because it's mounted on a rail, putting your system back together couldn't be simpler.

DON'T FENCE ME IN!
While it's swell for Tyan to provide so many PCI slots, there still aren't enough to waste with ill-placed USB ports—they'd be better off located at the back of the case.

ROOM TO GROW
Lotsa PCI slots available for whatever 3D fantasy you have in mind, and the ATX formfactor leaves room for full-length cards.

Dare to Compare

Micro X initially shipped the MXP-5000 to us with a Quantum Atlas II UltraWide SCSI hard drive connected to an Adaptec 2940UW because the new Fireball ST Ultra ATA drive wasn't ready. Since we had the case cracked and the system crunching through the first suite of benchmarks before we ever read the little note explaining this, we thought you might be curious as to how UltraWide SCSI stacks up against Ultra ATA.

TEST	ULTRA WIDE SCSI	ULTRA ATA	BENCHMARK
Time to boot (secs)	60	39	Boot
Time to shut down (secs)	05	04	Down
SYSmark32 Official Result	200	189	Win95 Apps
Adaptec ThreadMark v1.0(MB/sec)	5.49	3.80	Hard Drive
CD Tach/Pro v1.65 (K/sec)	1745	1868	CD-ROM
Quake v1.06 (fps)	15.8	16.9	DOS Gaming
Microsoft C/C++ (secs)	169	176	CPU/Disk
DeBabelizer Pro (secs)	360	361	MMX Performance

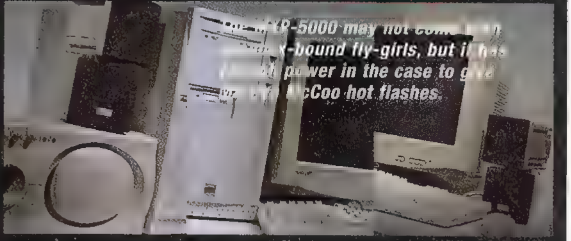
FILL 'ER UP
A total of three drive bays await your CD-R drive, DVD-drive, an extra hard drive, a removable media cartridge drive, or whatever else comes to mind.

Micro X

MXP-5000

real-world benchmarking

Test	Benchmark	Unit	Result
CPU/MOTHERBOARD	*bootMark*		61
WIN95 APPS	*SYSmark32*		165
DIRECT 3D	*Terramark*	composite	441
HARD DRIVE	*Adaptec ThreadMark v1.0*	MB/sec	3.30
CD-ROM	*CD Tach/Pro v1.65*	K/sec	1868
WIN95 VIDEO	*VidTach v1.52*	% played	89.1
DOS GAMING	*Quake v1.06*	fps	16.3
DIRECTX GAMING	*MDK PerfTest v1.4*		92
MMX PROCESSING	*DeBabelizer Pro*	secs	320
CPU/DISK	*Microsoft Visual C++ compile*	secs	171



The MXP-5000 may not come with [illegible]-bound fly-girls, but it has [illegible] power in the case to give [illegible] McCoo hot flashes.

under the hood

THE BRAINS

CPU	Intel Pentium 200MMX (P55C)
L2 Cache	512K pipeline burst double bank
RAM	32MB SDRAM DIMM (256MB maximum)
Video	Matrox Millennium PCI w/8MB WRAM
Motherboard	Tyan 1572 Titan Turbo ATX

THE BRAWN

Hard Drive	Quantum Fireball ST 2.1GB Ultra ATA
CD-ROM	Goldstar CRD-8160 16x Max
Expansion Bus	Four PCI; two ISA; one PCI/ISA shared
Fax/Modem	U.S. Robotics Sportster Vi 33.6Kbps DSVD
I/O Ports	Two USB; two serial; one parallel

THE BEAUTY

Display	Mag Innovision DX700T 17-inch (16-inch viewable) 0.25dpi (max res 1280x1024 32-bit color @ 60Hz)
Sound	16-bit Ensoniq AudioPCI
Speakers	Premier Sound Image Pro QX-SW32

EXPANSION MAP

PCI	Blocked
PCI	Free
PCI	Ensoniq AudioPCI
PCI	Matrox Millennium
PCI	Free/shared
ISA	Free
ISA	Free/shared
ISA	USR Sportster Vi

THE BUNDLE Windows 95 (OSR/2) ▮ Lotus Smart Suite 4.0 (1-2-3, Word Pro, Approach, Freelance Graphics, Organizer)

boot :39 **down** :04

+	−
Matrox Millennium w/8MB WRAM	Tinny speakers
Six SIMM and two DIMM slots	Murky monitor
430TX chipset	No 3D acceleration
Ensoniq AudioPCI sound card	
Quantum Fireball ST 2.1GB Ultra ATA	

Price $2,799
Company Micro X
Phone 800.642.1266
URL www.microx.com

boot verdict 8

A complete breakdown of benchmark results is available on the *bootNet*. Point your browser to www.bootnet.com

Meat Puppet

Hamburger on a string

TRY IT ON THE DISC

Sure, it's just a B-movie version of Origin's brilliant *Crusader: No Remorse*, but that doesn't stop *Meat Puppet* from being a pretty meaty little game in its own right.

You control Lotos, female assassin, as she penetrates a somber Art Deco industrial complex. Seen in overhead, isometric perspective, it's a world of about 300 zombie-infested locations split into seven areas.

Using weapons ranging from machine gun to flamethrower, you blast everything that moves, collect power-ups, and link with computer terminals to receive hints and recharge your armor. Control is handled by a configurable combination of mouse and cursor keys.

None of this breaks new ground. However, the software does some neat things with Win95, such as letting you switch between 640x480, 800x600, and 1024x768 on the fly. Based on DirectDraw—assisted by some Assembly-language blitter code—animation is smooth on a P166 at all resolutions.

CHECKLIST

Maximum Resolution/Color
1024x768/8-bit
Win95 Native
DirectX
DirectDraw DirectSound

One cool trick is the optional multi-threaded background loading of new rooms. This slows action a bit when you enter a new space, but it gives you a viewable display more quickly.

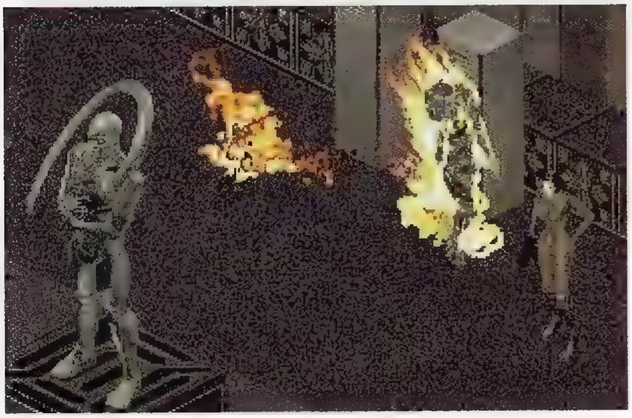
The 3D engine gives objects elevation, but the lack of true over-and-under construction results in a lot of ziggurat-shaped areas. DirectSound effects are good, as long as you don't mind hearing the guttural phrase "Subdoo di introoder!" about a million times. Enemy AI is also solid.

In short, this is a me-too product, but a very well-implemented one. If you like 'em dark, violent, and fairly difficult, you'll enjoy pulling the strings in *Meat Puppet*.

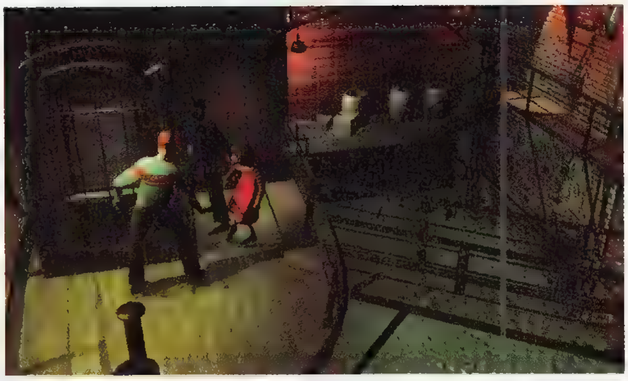
— Frank Lenk

boot verdict
7

Price **$50**
Developer **Kronos Digital Entertainment**
Publisher **Playmates Interactive Entertainment**
Phone **714.428.2100**
URL **www.playmates.com**



Meat Puppet **features more flames than Origin's *Crusader: No Remorse*, but fewer screams.**



Miette is saved from being locked up by the guard in one of *The City of Lost Children*'s cinematic sequences featuring three motion-captured characters interacting at once.

The **City** of Lost **Children**

Slow children at play

TRY IT ON THE DISC

Weary fraggers considering retirement to traditional puzzle games will find rest in *The City of Lost Children*, an adventure title based on the French movie of the same name. You wander the streets as Miette, a 9-year-old orphan who teams up with One, a gentle circus strongman, to free the children that the sinister scientist Krank has abducted. But be warned, this is one sedate gaming experience.

Dialogue is sparse, with no options to alter conversations. Miette's interaction with her environment is equally limited. She must be positioned in just the right spot to trigger an animated sequence so she can jump, open a door, or pick up objects. It gets tedious hearing: "I can't manage it" and "I can't do anything" because she isn't standing in exactly the right place.

Intense, first-person action this ain't. *Lost Children* is reminiscent of I-Motion's *Alone in the Dark* series, but has better graphics—the higher polygon counts for instance, are evident in the Miette character, which is composed of 400 triangles. Improvements include SVGA graphics, motion-captured, texture-mapped polygon characters, a pre-rendered 3D city to explore, and the ability to switch camera angles.

Unfortunately, there are no multiplayer options, no varied difficulty settings, and your inventory is limited to 10 items. And the full install dumps a fat 500MB load on your hard disk.

Lost Children takes itself too seriously and never really enthralls you in its quest. Miette may be spry, but the game lags, lacking urgency and suspense. Despite faithfully recreating the movie's dingy atmosphere, the game fails to capture its predecessor's sense of adventure and surreal feel. The original soundtrack is appropriately moody, but while *The City of Lost Children* may look gorgeous and sound great, it's too much about style and too little about compelling gameplay.

— Ingrid Bush

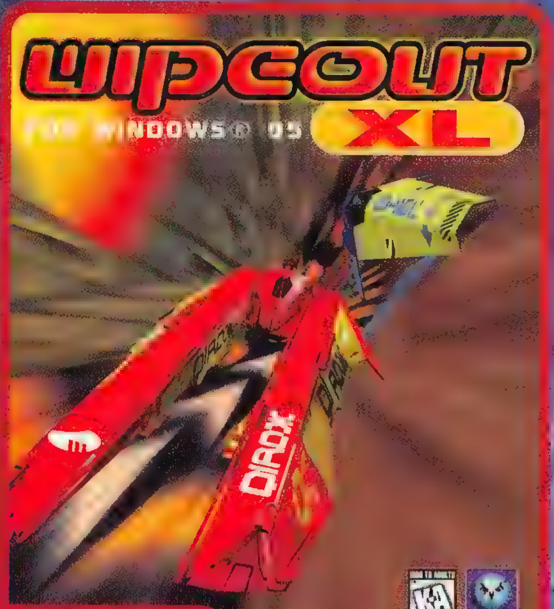
CHECKLIST

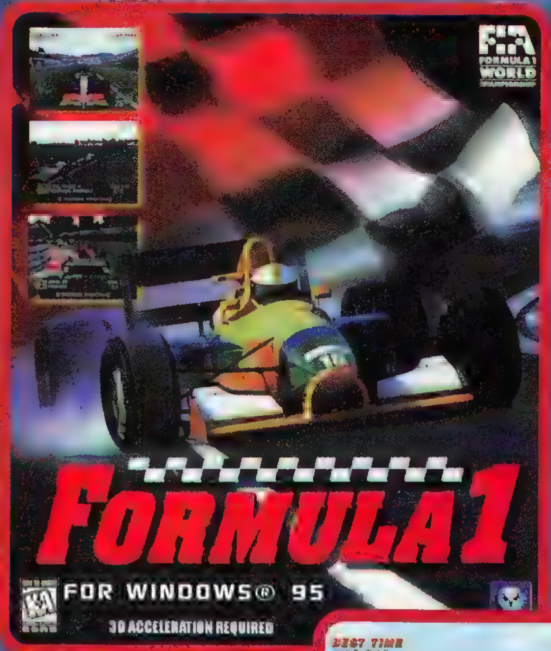
Maximum Resolution/Color
640x480/8-bit
MS-DOS

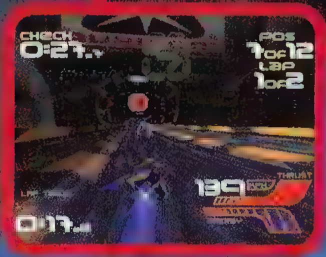
boot verdict
5

Price **$50**
Developer/Publisher **Psygnosis**
Phone **800.438.7794**
URL **www.psygnosis.com**

ACCELERATE


WIPEOUT XL
FOR WINDOWS® 95


FIA FORMULA 1 WORLD CHAMPIONSHIP
FORMULA 1
FOR WINDOWS® 95
3D ACCELERATION REQUIRED

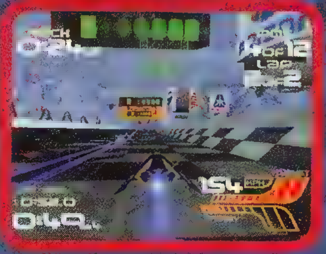

CHECK 0:21
POS 1 OF 12
LAP 1 OF 2

BEST TIME
LAP TIME

5 HERBERT 2 BENETTON RENAULT
FINISH LINE 1:37.909
TAG HEUER Official Timing

LAP 3 OF 3
0:56.

Wipeout XL and Formula 1. The most blistering 3D arcade race experiences available for the PC, coded specifically for the explosive graphics processing power of today's hottest 3D accelerator cards. Packed with all-action features, they represent the ultimate synergy of gameplay and design. No other games are optimized to get more razor-sharp graphics from your 3D accelerator card. So strap in, and see if you can keep the pace.


POS 4 OF 12
LAP 2 OF 2

1 ALESI FERRARI
THIS LAP 7.4
TAG HEUER Official Timing

Cutting-edge 3D graphics supported by the following cards:

WIPEOUT XL
- Video Logic Power VR
- 3DFx Card
- 3D Labs Permedia
- Rendition Verite
- ATI Rage Mk2

FORMULA 1
- Matrox Mystique
- 3DFx Card
- 3D Labs Permedia
- Rendition Verite

Check out downloadable demos and quick time videos at www.psygnosis.com

PC CD ROM

KIDS TO ADULTS K-A CONTENT RATED BY ESRB

PSYGNOSIS

FIA FORMULA 1 WORLD CHAMPIONSHIP

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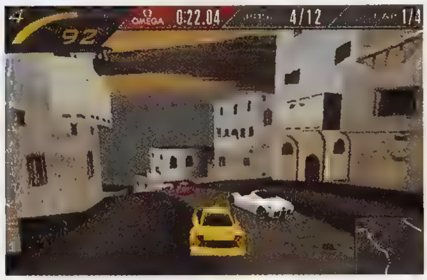
Product Information Number 279

Driving Miss Polygon

Open up the throttle with the latest racing sims

The feeling of speed... Nothing serves it up better than high frame rates. These driving games demonstrate how one programmer's SVGA graphics can flow smoothly on a Pentium 133 while another's graphics are nothing more than a slide show on even the fastest P200 MMX. Still, there isn't a single game here that wouldn't benefit wildly from hardware acceleration. We hope game developers get busy and start doing the right thing. Life moves at 60fps and so should a PC game.

— Bart Lane



***Need for Speed II* provides a nice mix of old-world charm and cutting-edge technology.**

Need For **Speed II**

If somebody told you that you could drive $4.5 million worth of machinery for about 60 bucks, you'd be interested, right? Well, get out your wallet. Electronic Arts makes this possible with *Need For Speed II*.

The all-new game engine enhances your driving experience with smoke, sparks, and spectacular hood-over-tailpipe crashes. You can set up camera angles just about anywhere you desire for instant replays.

Each screen pushes 2,000 polygons nearly as fast as a full-throttle Ferrari F50. This speed needs some serious hardware. Lacking support for 3D hardware acceleration, the 640x480 256-color game runs at 15fps to 18fps on a P200 MMX. Only a Pentium II pulls the frame rates necessary for responsive, adrenaline-pumping gameplay.

The game supports Immersion's I-Force force-feedback API. DirectPlay is bypassed, with network support through Win95's built-in IPX protocol. Other multiplayer options include modem, serial, and split-screen mode. Save your inheritance and enjoy pleasures previously held for a select few. Namely, a fast CPU to give you the frame rates necessary to put this sequel in the fast lane.

Price *$60*
Developer *Electronic Arts Canada*
Publisher *Electronic Arts*
Phone *800.245.4525*
URL *www.ea.com*

boot verdict 7

Test Drive: Off-Road

Test Drive: Off-Road is unusual only for the amount of disappointment it delivers. The only thing this 4WD game has going for it is a good soundtrack and attractive packaging. We've never seen a driving sim with such uncontrollable vehicles. It's nearly impossible to set your truck on a straight path in the desired direction. Steering like this does not make a game challenging, only frustrating.

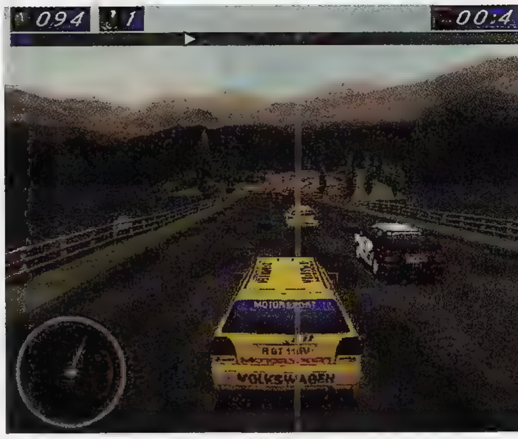
While it's Win95 friendly, we wouldn't want to meet the machine that can run this game in SVGA in a dark alley. Disabling a few graphics luxuries allows it to run smoothly enough in the mysterious "Mode-X" setting; Read this as somewhere between 640x480 and 400x320, closer to the latter. The game is coded with a true 3D-graphics engine that allows you to stray from the standard courses for some uncharted exploration. Polygons are painted with a flat color palette that does little for the eye. Although all forms of controller input are supported, the keyboard is the only playable choice. Misery does love company and this game will do multiplayer.

If you want off-road fun, take a look at *Monster Truck Madness* and steer wide of *Test Drive: Off-Road*.

We certainly hope real Hummers don't handle as poorly as they do in *Test Drive: Off-Road*.

Price *$40*
Developer *Elite Software*
Publisher *Accolade*
Phone *408.985.1700*
URL *www.accolade.com*

boot verdict 2



***Rally Championship*'s courses are long, bumpy, and point to point.**

Rally **Champion**ship

This modest driving sim will spoil you with its versatility. From the working wipers to the oven-mitt driving gloves, Virgin leaves no stone unturned with this deceptively beguiling European Rally racer.

Don't get us wrong. This game won't win any beauty contests. At its best, it suffers from severe pixelation. But the 640x480 256-color engine has the horsepower to push the texture-mapped polygon terrain fast enough to cake your mudflaps permanently. The car's handling physics are impressive. When you scream into a hairpin bend, be prepared to broadslide through the turn.

While driving at night, a bank of halogens illuminate the tarmac 40 feet in front of your car. Dirt, snow, and rain will accumulate all over your car, including the windshield. All of this runs at a smooth 24fps on a P200 MMX.

The sound effects are so understated that they're eerily true to life. You will really feel alone somewhere in the Black Forest as you blaze down a 60-mile, winding dirt track at triple-digit speeds. Switching camera modes between cockpit, hood, and third-person brings appropriate background noises for each.

Top all this off with a simple-to-use front-end that makes multiplayer setup a snap, and you have a zippy alternative to more heavy-handed approaches common in both NASCAR and Formula 1 racing simulations.

Virgin Interactive has raised the level of realistic driving sims a notch with *Rally Championship*. Step aside, NASCAR, the four-cylinder is king.

Price *$35*
Developer *Magnetic Fields*
Publisher *Virgin Interactive*
Phone *714.833.8710*
URL *www.vie.com*

boot verdict 7

TX Motherboard **Terrors**

Feeling the MMX itch

The 430TX (previewed in boot 09) is Intel's last Pentium-based PCIset. But, with every motherboard manufacturer slapping this shiny new chipset on their motherboards, and Intel's P233MMX, AMD's K6, and Cyrix pumping life into the old Socket 7, we decided to take these motherboards out for a spin and do a little chipset comparison.

— Andrew Sanchez

BCM **FR550**

The BCM FR550 ATX motherboard is ready to meet your bus-mastering needs with six usable slots (four PCI slots and three ISA).

The FR550 uses a slightly smaller formfactor, resulting in a tighter squeeze for the onboard components. The floppy header connector is curiously positioned away from the EIDE connectors, but the ZIF socket is right next to an ATX-compliant power-supply fan—much closer than Tyan's socket. All the necessary connectors are safely located away from the expansion slots, and jumpers are clearly marked on the board.

Maximum jumper settings are for 66MHz, while bus-clock frequencies can be multiplied up to x3. USB header connectors are onboard, but aren't integrated into the baseboard I/O panel. Thankfully, you won't block any expansion slots with an add-in USB connector.

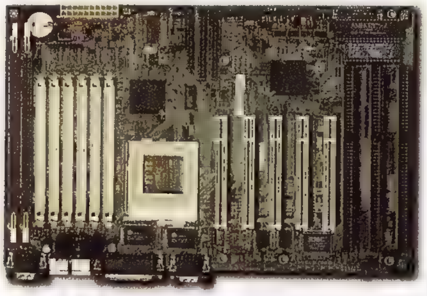
The BCM performed strongly throughout our tests, but only beat the Tyan in L2 cache speed.

The Stats

BIOS *Award BIOS v4.51PG*
CPU SUPPORT *Intel P54/P55C (MMX), AMD K5/K6, Cyrix 6x86*
L2 CACHE *512K integrated pipeline-burst mode*
RAM SLOTS *Four SIMM, two DIMM*
MAX RAM *256MB*
EXPANSION *Three PCI, two ISA, one PCI/ISA shared*
PCIset *Intel 430TX*

boot verdict 7

Price **$145**
Developer **BCM Advanced Research**
Phone **714.470.1888**
URL **www.bcmcom.com**



Tyan **S1572**

Sporting five bus-mastered PCI slots, Tyan's S1572 ATX motherboard delivers maximum PCI pleasure. 512K of non-upgradable, soldered-in pipeline-burst L2 cache handles your CPU's needs.

Also available in AT, the ATX formfactor harbors all your serial connectors, PS/2 mouse and keyboard connectors, although the USB ports—like the BCM—aren't incorporated into the baseboard I/O panel. The motherboard's header connector is armed for twin USB, but you'll need to stuff the optional bracket-mounted USB connector into a free expansion slot, unless the metal plate that sits above your ATX I/O section has provisions for USB connectors.

Overall, motherboard layout is tightly packed. Two DIMM and six SIMM slots to the ATX power-supply fan and the ZIF socket is directly below them, it could move closer to the fan. Floppy and IDE header connectors are located close together, and jumper settings are clearly marked on the motherboard. CPU clock frequency multiplier max out at x3. The presence of a power LED is a troubleshooter's dream—other manufacturers should also include it.

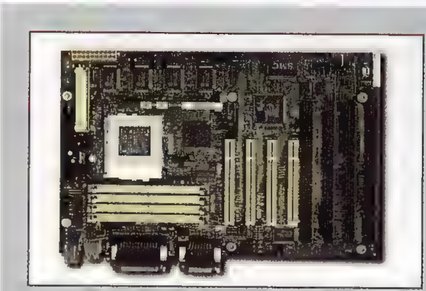
In our benchmarking, the Tyan edged out the BCM in the bootMark and main memory speed, but the BCM narrowly won the L2 cache speed test.

The Stats

BIOS *Award BIOS v4.51PG*
CPU SUPPORT *Intel P54/P55C (MMX), AMD K5/K6 (latest rev), Cyrix 6x86*
L2 CACHE *512K integrated pipeline-burst mode*
RAM SLOTS *Six SIMM, two DIMM*
MAX RAM *256MB*
EXPANSION *Four PCI, two ISA, one PCI/ISA shared*
PCIset *Intel 430TX*

boot verdict 8

Price **$179**
Developer **Tyan Computer**
Phone **408.956.8000**
URL **www.tyan.com**



Micronics **M55Hi+**

Is the price of a new P200 MMX CPU harshing your mellow? Keep the reliable P200 that's faithfully served you all these months. Are pangs of USB urging you forward? If MMX doesn't chill your will, then the Micronics M55Hi+ is a strong contender... if you don't mind being locked into the Intel CPU mindset.

Micronic's ATX formfactor motherboard harbors all the goodies you'd expect, including twin USB ports, integrated VRM, and a Creative Labs Vibra 16 sound card pumping out pure, 100% Sound Blaster compatibility. Header connectors for a wavetable upgrade are located onboard.

The one big problem for you alternate CPU users is that the M55Hi+ only deals with Intel CPUs. AMD and Cyrix users are out of luck with this motherboard.

The Stats

BIOS *Phoenix BIOS v4.05*
L2 CACHE *512K integrated pipeline-burst mode*
CPU SUPPORT *Intel P54C*
RAM SLOTS *Four SIMM*
MAX RAM *256MB*
EXPANSION *Three PCI, two ISA, one PCI/ISA shared*
PCIset *Intel 430HX*

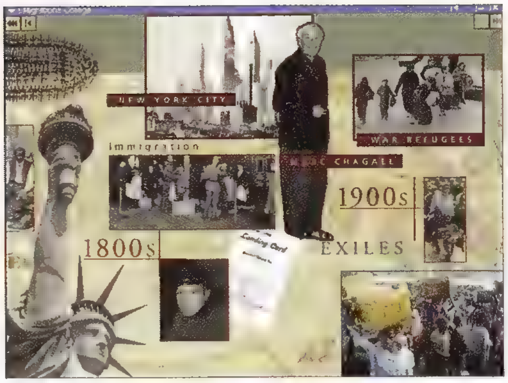
boot verdict 6

Price **$149**
Developer **Micronics**
Phone **800.577.0977**
URL **www.micronics.com**

Dare To Compare

Here's how the motherboards stack up. Scores in bold type indicate the highest score in a given category. The same 16MB of EDO-DRAM was used throughout the tests.

TEST	TYAN S1572	BMC FR550	MICRONICS M55HI+
bootMark (average)	**52.3**	50.0	44.0
DMA transfer rate (MB/sec)	69.5	68.0	**96.9**
Memory speed(MB/sec)	**117.1**	111.4	100.9
L2 cache speed (MB/sec)	171.8	**172.4**	148.6
GLQuake 640x480 (fps)	28	28	28



Encarta 97 Deluxe Edition

More than just an encyclopedia

Building on a solid foundation, *Encarta 97* adds more images, interactive features, and in-depth information to an already impressive product. Whether you want to give your gray matter a rigorous workout or just troll around exploring obscure topics, *Encarta* has the tools you need for school and beyond.

Encarta 97 offers intellectual, visual, and aural stimulation in a highly interactive format. Learn to count to 10 in Comanche or strain your brain with some quantum electrodynamics. You'll find the info you need (and more) easily accessible via the clear and easily navigable interface. All the reference essentials are here: atlas, dictionary, encyclopedia, word processor, web links (*Internet Explorer* is included), annual updates... you name it.

A handy new feature that improves on the previous version is the ability to double-click on a word to see its dictionary definition, while tried-and-true features such as customizing options—selecting text size and the format of the information display—are still around.

One minor quibble: *Encarta 97 Deluxe* comes on two discs, so unless you have a multiple-disc drive you'll have to do some swapping. That aside, having *Encarta 97* on your desktop will ensure you never look like a reference chump again.

— *Ingrid Bush*

Price $55
Developer/Publisher
Microsoft
Phone 800.426.9400
URL www.encarta.msn.com

boot verdict 9

George Clinton **P-Funk Remix**

Why must I chase this cat?

SEE IT ON THE DISC

Next time you're throwing down the bootelicious house party, bust out Mixman's *George Clinton P-Funk Remix* and start sampling tracks from Clinton's *Greatest Funkin' Hits* collection. The mix of 16 exceptionally clean tracks—bass, beats, riffs, sound effects, and the distinctive vocals—comes straight from Clinton's master tracks and is so smooth that even this white boy could pack the floor.

The interface will be familiar to anyone who's used any of Mixman's previous titles. All the proprietary samples can be accessed from the keyboard (the preferred method for desktop DJs) and a handy template showing all the right keys provides training wheels for the neophyte.

Unfortunately, you won't be joining Clinton onstage with the P-Funk Remix because, like Mixman's previous titles, you can't add your own samples to the mix and you can't export your mixes as digital audio tracks. For these abilities, you'll have to wait for their next release, *Mixman Studio*—or get Microforum's *New Beat Trancemission*. But then you'd never get to make the Atomic Dog go bow wow wow yippee yo yippee yeah!

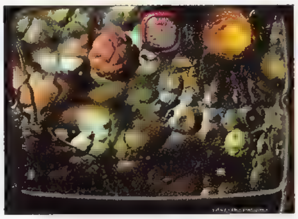
— *Brad Dosland*

Price $30
Developer/Publisher
Mixman
Phone 415.403.1382
URL www.mixman.com

boot verdict 8

Life in the Universe

Hawking inferior goods



SEE IT ON THE DISC

Stephen Hawking's collection of essays, titled *Life in the Universe* is based on a remarkable series of lectures that ponder the existence of extraterrestrial life by exploring the origin and development of life on Earth. The topic cries out for interactive multimedia to ease you into the subject by supplementing the knowledge that Hawking takes for granted.

Unfortunately, the *Life in the Universe* CD-ROM—a Macromedia *Director* application from MetaTools—fails to answer that cry.

It's unfortunate that an interface as beautiful as this is so frustrating and impenetrable. The lecture at the heart of the CD-ROM has hyperlinks that don't take you directly to the referenced topic but drop you into terrain where you must explore (i.e., troll) for hot spots until you find the infobit that explains the hyperlink. An "intelligent agent," the Phage, accompanies you through each screen bobbing around and dodging your cursor, but it never reassures you that there's any intelligence behind its actions. The worst offense is the lack of bookmarking to enable you to pick up where you left off.

You're better off buying Hawking's collection of *Life in the Universe* essays in paper-based book form and conducting searches on the web for supplementary material. At least that way you have functioning hyperlinks and bookmarks.

— *Sean Downey*

Price $40
Developer/Publisher
MetaTools
Phone 800.472.9025
URL www.metatools.com

boot verdict 5

Web**Compass**

TRY IT ON THE DISC

Power-searching through an ocean of information

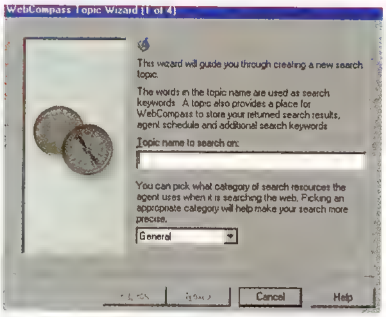
Searching through the web for nuggets of information can be like pouring the entire ocean through a fish net to find that little blue snorkel you lost in St. Croix. But don't give up hope. *WebCompass* gives you a very strong fish net to query 35 search engines and summarize the results in an easy-to-use interface.

You can run queries either by entering keywords in a search box at the top of the screen or by running the Topic Wizard. There's also the option of searching several Internet databases, including health, investment, media, and general. *WebCompass* comes with 35 search resources preloaded, and it's a snap to add your own.

Once you've entered a query, *WebCompass* peels through the search engines you've specified and reports on each result with the title of the page, the URL, and a summary of the page based on sentences in the page's text. With a few exceptions, these summaries are informative and comprehensive. Queries can be saved and scheduled for running at regular intervals, so you can find the most recent materials without repeatedly searching the same place.

It's too bad if you're not satisfied with one-word queries, because you'll run into problems when designing Boolean searches. A phrase such as +"Carolina Panthers" +"Kevin Greene–sack" would appear to be agreeable with all the search engines *WebCompass* uses, but the program doesn't assimilate all the quirks inherent in the various engines. Instead, it offers a way to send a Boolean phrase directly to a specific search site. Because Boolean phrasing is integral to power searching, *WebCompass* loses points for comprehensiveness. All the same, it does add leverage to your Internet hunts.

— *Tara Calishain*



This wizard will guide you through creating a new search topic.

The words in the topic name are used as search keywords. A topic also provides a place for WebCompass to store your returned search results, agent schedule and additional search keywords.

Topic name to search on:

You can pick what category of search resources the agent uses when it is searching the web. Picking an appropriate category will help make your search more precise.

General

***WebCompass* offers a wizard for designing search queries.**

Price $50; $30 for upgrade
Developer/Publisher Quarterdeck
Phone 800.683.6696
URL www.quarterdeck.com

boot verdict 7

Smart **Bookmarks 3.0**

Let your bookmarks do the walking

TRY IT ON THE DISC

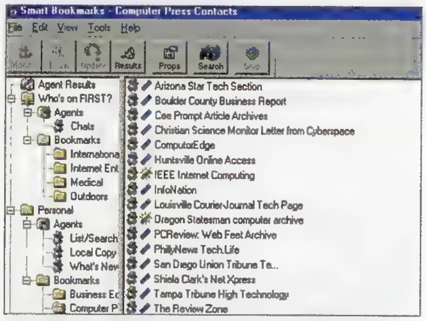
The trouble with Push technology is that you can end up with way too much information. You get pushed and shoved, and, ultimately, stuffed. At the same time, it's essential to keep track of changing web sites without having to surf to each one on a regular basis. FirstFloor Software's *Smart Bookmarks 3.0* notifies you when web sites change and provides an elegant alternative to Push.

Call it "nudge technology." *Smart Bookmarks* integrates with your browser, keeping your bookmarks in a stand-alone application. You can assign agents to the bookmarks to monitor changes to full web sites as well as changes to link lists on a specific page. (You can keep copies of the bookmarked pages on your hard drive so you don't have to wait for them to load.) The agents can be launched manually or scheduled to monitor pages automatically. When a page has changed, a bright yellow icon pops up behind the bookmark. Nudge.

Sound good? It gets better. The Win95 version of *Smart Bookmarks* includes a Smart Ticker that runs across the top of the screen. As *Smart Bookmarks* agents monitor your bookmarks for changes, the changed bookmarks run across the Smart Ticker. Double-click on a listing in the Ticker to jump straight to your browser and the changed page.

It's not glitzy, and it doesn't have lots of cool animated ads, but when it comes to monitoring web pages, *Smart Bookmarks 3.0* gives you the nudge you need.

– *Tara Calishain*



Agent Results
Who's on FIRST?
Agents
Chats
Bookmarks
Internationa
Internet Ent
Medical
Outdoors
Personal
Agents
List/Search
Local Copy
What's New
Bookmarks
Business Ec
Computer P

Arizona Star Tech Section
Boulder County Business Report
Cee Prompt Article Archives
Christian Science Monitor Letter from Cyberspace
ComputorEdge
Huntsville Online Access
IEEE Internet Computing
InfoNation
Louisville Courier-Journal Tech Page
Oregon Statesman computer archive
PCReview: Web Feet Archive
PhillyNews Tech.Life
San Diego Union Tribune Te...
Shiela Clark's Net Xpress
Tampa Tribune High Technology
The Review Zone

Automatically monitor your bookmarks or just list them with *Smart Bookmarks 3.0.*

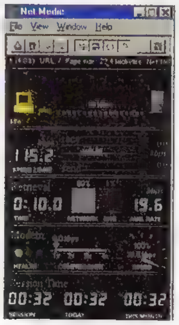
Price $35
Developer/Publisher FirstFloor Software
Phone 800.639.6387
URL www.firstfloor.com

boot verdict 9

Net. Medic

TRY IT ON THE DISC

To the rescue



***Net.Medic* keeps track of all the factors that make the difference between surfing and trolling.**

Can't figure out what's up—or down—with your Internet connection? *Net.Medic* is a troubleshooter that tracks a suite of connection statistics, including the size of the page you're downloading, the number of hops between your computer and the site you're accessing, and the average speed of your download. It also does automatic diagnostics, identifying problems caused by remote servers, hops in between, your local ISP, and low memory on your computer.

Net.Medic is an enlightening utility for learning about Internet topology, perfect for stat freaks, and the interface looks like an airplane cockpit control.

— *Tara Calishain*

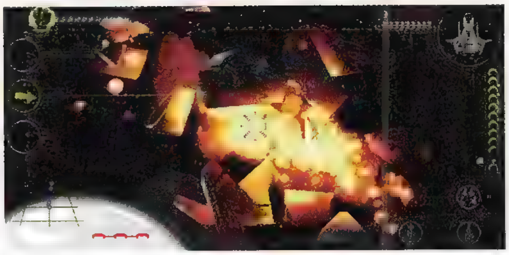
Price $50
Developer/Publisher VitalSigns Software
Phone 408.980.8844
URL www.vitalsigns.com

boot verdict 8

TRY IT ON THE DISC

Darklight **Conflict**

A lean, mean, space-combat machine



Enemy ships erupt in a fiery display of Gouraud-shaded polygons and high-res bitmapped explosions in *Darklight Conflict.*

Darklight Conflict's streamlined space combat makes no apologies. The bare-bones HUD and stripped-down controls leaves little between you and the black void of space.

Without the aid of 3D acceleration or MMX, *Darklight Conflict* pulls off an array of impressive visual effects. The graphics are sparse but colorful, featuring Gouraud-shaded polygons and high-count pixel explosions. The real-time multisource and lens-flare lighting effects add dazzle to suns, weapons, and navigation lights, yet a P200 MMX maintains a respectable 20fps.

More than 50 missions await solo pilots, ranging from simple dogfights and defensive patrols to multipart sorties and starship bombing runs. The game is structured to gradually hone your flying skills as you advance through increasingly advanced alien targets. The zero-gravity flight model, once mastered, offers excellent strafing, banking, and sliding within 3D space. Unfortunately, gameplay suffers from disorienting movement sensation. While this physics model realistically creates the sensation of space, it hampers any notion of positional awareness.

CHECKLIST

Maximum Resolution/color
640x480/8-bit

MS-DOS

Multiplayer
LAN IPX

Six-player deathmatches rage across a network and a patch will soon be available on EA's web site to provide modem support. At the time of this writing there's no mention of downloadable patches to add the extra multiplayer modes—such as tag, race, group cooperative, and capture the flag—that were *supposed* to ship with the game. Still, the inclusion of two discs for multiplayer mayhem is a gesture more publishers should adopt.

Unencumbered by tedious sci-fi plotting or FMV excess, *Darklight Conflict* delivers beautiful 3D effects, but the gameplay may leave you floating in space.

— Scott A. May

boot verdict 7

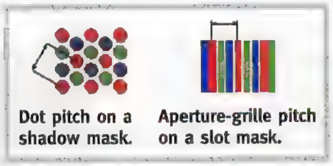
Price $50
Developer Rage Software
Publisher Electronic Arts
Phone 800.245.4525
URL www.ea.com

ViewSonic **PT813** Monitor

A window into color heaven

Few monitors adequately display the rich colors of Mother Nature, but the ViewSonic PT813 steps up to the challenge with its aperture-grille technology, an alternative to shadow mask CRT.

Aperture-grille monitors display images more brightly, with richer, more saturated colors than shadow-mask monitors, but shadow-mask technology offers a more dimensionally accurate display. Desktop publishers prefer aperture-grille monitors for color graphics applications, while shadow-mask monitors are better suited to CAD/CAM work.



Dot pitch on a shadow mask. **Aperture-grille pitch on a slot mask.**

Pictures courtesy of ViewSonic Corporation.

Aperture-grille tubes use stripe pitch—measurement of the horizontal distance between phosphors. Dot-pitch monitors measure the diagonal distance between phosphors. In either case, the smaller the pitch, the better the picture, and grille pitch is slightly bigger than the equivalent dot pitch. The PT813's grille pitch is a 0.28mm stripe pitch, but it displays as if it were a 0.30mm dot-pitch monitor, which makes text hard to read at 1600x1200.

Switching between text and graphics mode is anything but graceful. Other problems include flickering during the white-level shift test and a slight geometric distortion at the screen's periphery. Color convergence is produced by superimposing independently-generated red, green, and blue images, and the ViewSonic PT813 does an excellent job under this most excruciating test. All moiré patterns are easily cleaned up with the on-screen adjustments, another big plus.

The high-contrast, flat-screen surface displays colors brightly, but its smooth glass creates glare and unwanted reflections, despite its ARAG screen treatment. The OnView on-screen controls offer a healthy assortment of controls using ViewMatch technology for color correction, and there are BNC and D-sub connections on the back.

If you're a graphic designer, consider the ViewSonic PT813, but be aware that there are other—less expensive—monitors that incorporate a lower grille pitch with about the same number of user controls.

— Sean Cleveland

boot verdict 8

Price $1,599
Company ViewSonic
Phone 800.888.8583
URL www.viewsonic.com

Tech Specs

Tube	21-inch/20-inch viewable
Grille Pitch	0.28mm
Max Resolution	1600x1200 @ 85Hz
Horizontal Freq	30kHz to 107kHz
Vertical Freq	50Hz to 160Hz
Case Dimensions (HxWxD inches)	19.5 x 19.3 x 20.5
Weight	74 pounds
Plug-n-Play	Yes; DDC Levels 1, 2B
Emissions	MPR-II, TCO
Power Mngmt	Energy Star, VESA DPMS (130W, 80W, 15W, 8W)

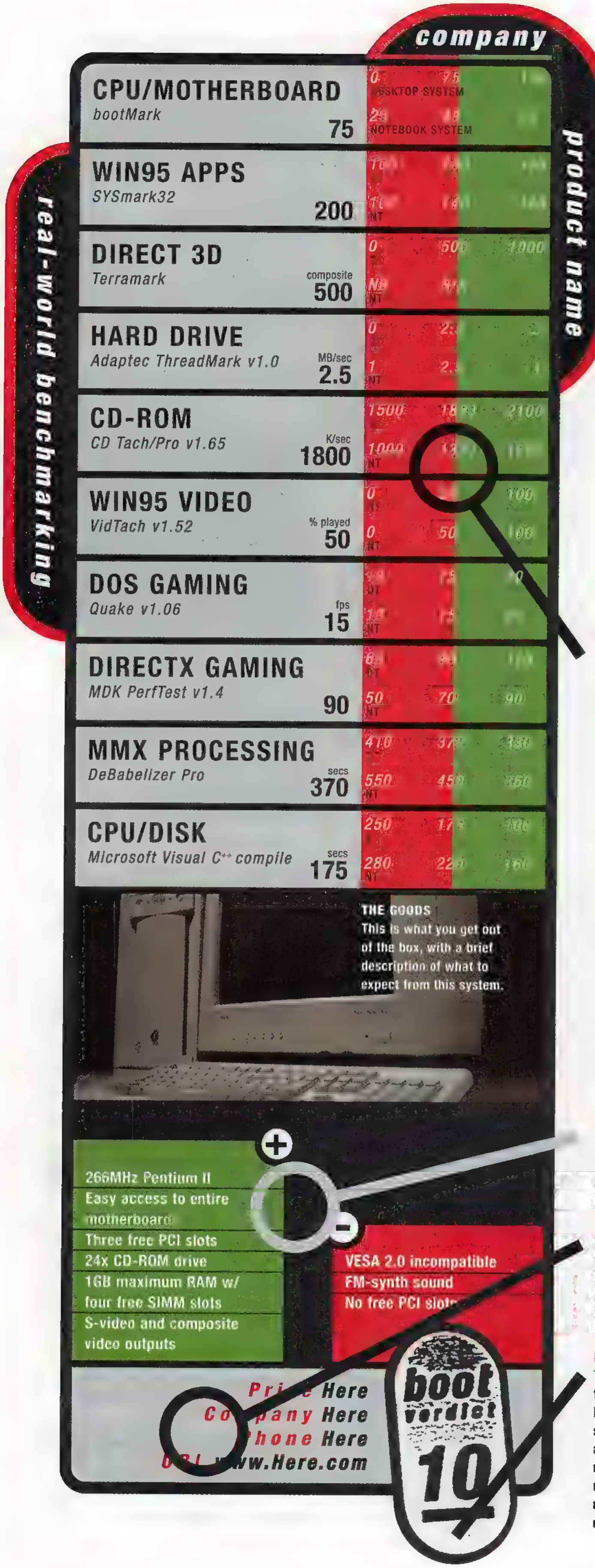
The PT813's controls are easy to get to and simple to use, which is handy, because this is a large monitor weighing a whopping 74 pounds!

bootLab **Policy**

__boot__ isn't like any other computer magazine, and neither is our product-__evaluation__ process. We don't test equipment in the cold, sterile environment of a warehouse-size lab, and we don't write our reviews based on the __test scores__ that labcoat-wearing technicians scribble on clipboards.

Our review __scores__ are based on a combination of objective __benchmark__ testing, real-world performance, and our subjective evaluation of features, performance, and the many less tangible __characteristics__ that go into a product. All of our evaluations are based on __hands-on__ use of the product.

Only the **best** earn enough respect to be worthy of our **editors'-choice** award.


company
product name
real-world benchmarking
CPU/MOTHERBOARD
bootMark
75
DESKTOP SYSTEM
NOTEBOOK SYSTEM
WIN95 APPS
SYSmark32
200
DIRECT 3D
Terramark
composite
500
HARD DRIVE
Adaptec ThreadMark v1.0
MB/sec
2.5
CD-ROM
CD Tach/Pro v1.65
K/sec
1800
WIN95 VIDEO
VidTach v1.52
% played
50
DOS GAMING
Quake v1.06
fps
15
DIRECTX GAMING
MDK PerfTest v1.4
90
MMX PROCESSING
DeBabelizer Pro
secs
370
CPU/DISK
Microsoft Visual C++ compile
secs
175
266MHz Pentium II
Easy access to entire motherboard
Three free PCI slots
24x CD-ROM drive
1GB maximum RAM w/ four free SIMM slots
S-video and composite video outputs
VESA 2.0 incompatible
FM-synth sound
No free PCI slots
Price Here
Company Here
Phone Here
URL www.Here.com
boot verdict
10

THE GOODS
This is what you get out of the box, with a brief description of what to expect from this system.

REAL-WORLD BENCHMARKING
The new meter has the precise scores for each category benchmarked. Plus, the color bars to the right give you a quick idea of how well the system performed in that category.

It's simple: The farther right the bar reaches, the better the system scored. Green means the system performed on par or beyond what we expect of a current system. If you see nothing but red, the system performed below expectations.

PLUSES AND MINUSES
Here's where we list the best and worst a system has to offer.

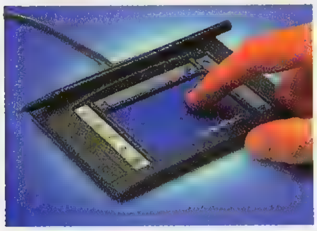
CONTACTS
Look here for price, and the company's phone number and URL if you want more information.

BOOT VERDICT
The one that really matters. This score reflects how we feel about a system, taking into account the benchmark results, quality of parts, usability, overall performance, and our intense, under-the-hood scrutiny.

PRODUCT ANNOUNCEMENTS THEY **TELL** US, WE **PASS** IT ALONG

TOUCHY FEELY THINGY

If you're tired of the lousy control that your mouse provides, check out the $70 VersaPad, a PC touchpad that offers precise cursor control, pan and scroll capability, a customizable toolbar, on-the-fly-signature and graphics capture, and a variety of other touch-sensitive features.



The VersaPad requires as little as 5 to 10 grams of downward pressure (approximately half the weight of a finger) and delivers effortless cursor control, adjustable pad resolution, and tap sensitivity. VersaPad also provides a five-key toolbar, which can be personalized, located to the left of the pad's surface.

Using the bundled VersaPad software, you can easily assign programs, web browser commands, Windows functions, and macros for quick access. The VersaPad also provides on-the-fly signature and graphics capture. From any Win95 application, simply press the appropriate key, pick up the stylus and sign your name, scribble a note, or doodle on the pad. A second press of the button captures the input, pasting it directly into your current work or Win95 clipboard.

Interlink Electronics: 800.340.1331; www.interlinkelec.com

NOW HEAR THIS

For years notebook users were forced to listen to lousy FM-synth sound, while their desktop brethren basked in the sweet sounds of wavetable synthesis. Well, not any more. The **EMU8710 Audio PC-card** is a high-quality music and sound processing system for notebooks, providing wavetable synthesis music and high-quality digital streaming audio.

EMU8710
E-MU
INSERT THIS WAY

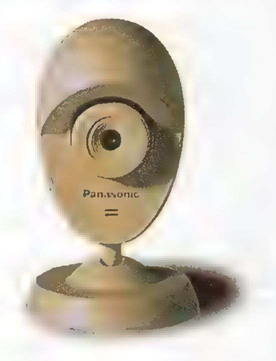
The EMU8710 includes 2MB of sample ROM containing more than 300 General MIDI and GS-compliant sounds, and 512K of RAM to download customizable SoundFonts. The EMU8710 also supports 32-note polyphony, 32-part multitimbrality, and provides multiple reverb and chorus effects. An optional MIDI breakout box with an S/PDIF digital output is also available.

E-mu Systems: 408.438.1921; www.emu.com

ROOTY TOOTY, FRESH AND FRUITY

What do you call a desktop video camera with egg-ceptional image quality and an egg-cellent price? If you're Panasonic, you call it the **EggCam**, a new, low-cost video e-mail and teleconferencing solution that looks just like an egg.

With its tilt-and-swivel base, the EggCam is designed to sit on top of a monitor, and can produce images with resolutions up to 542x496. There's also an omnidirectional microphone built into the camera to simultaneously record audio. An adjustable-focus lens captures subjects from as close as 3.9 inches out to infinity. The camera also includes automatic gain control to correct exposures in variant lighting conditions.



VideoLink Mail software allows EggCam users to compress audio/video messages, which can be sent as e-mail attachments, and the bundled CU-SeeMe software can be used for real-time videoconferencing through a traditional dial-up, Internet, or LAN connection. A miroVidCon PCI video-capture board is also included in the $249 price.

Panasonic: 800.742.8086; www.panasonic.com/alive

ANGELS IN THE CPU

More than 2,000 computers are stolen each day in the United States—that's three PCs and one notebook every 30 seconds! Prevent your precious PC from becoming a criminal statistic with **The CyberAngel**, Computer Sentry Software's security system for notebook and desktop PCs.

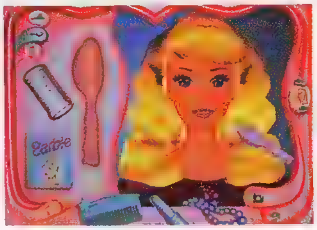
Once you've installed the appropriate software, choose a password and designate how you want to be notified in case of theft. This data is transmitted via modem to Computer Sentry's security center. Every time you boot up your PC you must enter a password through an invisible prompt. If no password is entered, The CyberAngel will allow a few keystrokes and then spring into action. Once the system is connected to an outside line, The CyberAngel will turn off the modem speakers and quietly dial up the security center, alerting officials to the unauthorized access. The security center will then track and identify the phone number and location, and notify you within minutes. If unauthorized entry is detected, The CyberAngel will also block any further unauthorized use of the modem and communication software.

The CyberAngel software can be downloaded for free from Computer Sentry's web site. The monitoring service is $40 per year.

Computer Sentry Software: 800.501.4344; www.sentryinc.com

MY DINNER WITH BARBIE

For nearly 40 years girls (and boys) have talked to their Barbie dolls during playtime. Now Barbie can talk back, thanks to **Talk With Me Barbie**, an interactive doll from Mattel.



Using the included CD-ROM, kids can choose from multiple topics of interest, including careers, dating, shopping, parties, and—our personal favorite—playing house. These personal choices are then downloaded to the doll (via an infrared port located in Barbie's diamond-studded necklace) for a variety of personaizedl, play experiences. The doll can even be programmed to say the child's name, and when Barbie speaks her mouth really moves!

Barbie Magic Hair Styler, Barbie Ocean Discovery, Barbie Print and Play, and Barbie Screen Styler CD-ROMs are also available, ranging in price from $29 to $35.

Mattel Media: 888.628.8359; www.barbie.com

THE EYES HAVE IT

If you're experiencing blurred vision, headaches, and dry eyes you may be suffering from computer eyestrain, an ailment which, according to the American Optometric Association, affects more than 60 million people in the United States each year. But, thanks to Ergo Vision's **GlareWare Computer Eye Glasses**, your suffering may soon be over.

The GlareWare Computer Eye Glasses are designed to prevent computer eyestrain by combining patented technology with fashionable eyeglass frames. The GlareWare lenses use a chemical resin coating that intercepts glare before it reaches your eyes. Plus, a coated shield on top intercepts overhead and ambient light—something computer glare screens can't do.

GlareWare Computer Eye Glasses come in three styles including a clip-on version for people with prescription eyeglasses.

Ergo Vision: 888.664.5273; www.ergovision.com

007 DIGITAL CAMERA

If you've been staking out your neighbor's house or just wish you had a pocket-size camera for those weekend covert operations, take heart. Sony Electronics has introduced a "lipstick" digital camera, featuring a $^1/_4$-inch CCD chip and a $1^5/_8$-inch camera head, designed to produce high-resolution video in a variety of space-critical applications.

Weighing about 2 pounds, the **DXC-LS1** outputs an NTSC resolution of 470 lines and offers a signal-to-noise ratio of 58dB. The camera's adjustable color matrix lets you adjust colors independently so you can modify an image until the object on screen looks exactly like the object you're shooting. The camera is also equipped with a built-in RS-232C serial-port interface. If you find yourself wanting to eavesdrop on private conversations, you'll be happy to know the camera can also be operated via the included remote control. The $1,650 price tag also includes an Exchangeable Camera Head, which is handy in unfortunate circumstances such as gunshots, C4, or grenades resulting in loss or damage to the existing camera head.

Sony: 800.472.7669; www.sony.com

WONDER TWIN POWERS ACTIVATE

You may not get to leap over tall buildings, but at least it's a start. **Guardians: Agents of Justice** is a superheroic game that puts you in command of a crack team of super-powered crime fighters toiling against the forces of evil.

The game features 14 predesigned heroes, or you can create your own using the custom-character generator. Once selected, the heroes move through randomly generated, multi-level, isometric combat maps exploring buildings, blasting through walls, and fighting the all-too-powerful evil villains. Combined, the heroes and villains possess more than 80 powers and skills, all of which can be altered or combined.

Agents of Justice will take advantage of the latest 3D accelerator cards and MMX technology. Modem, LAN, and Internet play are also supported. Look for Guardians: Agents of Justice later this year.

MicroProse: 800.695.4263; www.microprose.com

MAY THE FORCE BE WITH YOU. SORT OF

If you haven't had your fill of Luke, Darth, Leia, and the rest of the gang, jump into hyperspace with **Star Warped**, a parody of the recently remastered Star Wars film trilogy that's filled with a slew of wickedly warped, twisted, and hilarious games and activities based on the Lucas empire.

Some of the 10 key games include: "U Don't Know Jedi"—a game-show trivia game with more than 80 questions; "Death Star Destructo"—a shoot-'em up game; "Whack the Ewok"—accompanied by Darth, you get to chase down those furry Ewoks and knock them around; "Gene Splicer"—see what happens when you combine parts of Luke with parts of Leia; and "Tell You, I Will"—a Yoda fortuneteller and Magic 8-ball wannabe.

Star Warped is available now for $20.

Palladium Interactive: 800.910.2696; www.starwarped.com

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intel inside pentium

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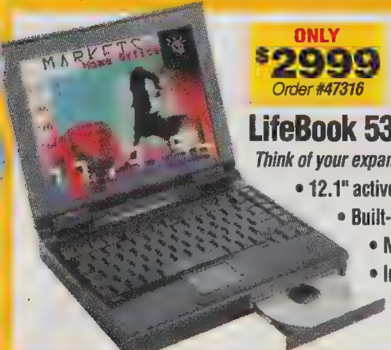

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*Capable of downloading at 56 Kbps; however, current regulations limit transmission to 53 Kbps

166MHz PROCESSOR

16MB EDO MEMORY

3.0GB HARD DRIVE

10X CD-ROM

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Notebook Computer Selection Guide

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Acer	TI Extensa	610CD	P150	1.4GB	16MB	10X	6.8lbs	11.3" SVGA DS	*#44942*	$1899
Acer	TI Extensa	660CDT	MMX 166	2.1GB	16MB	10X	6.8lbs	11.3" SVGA TFT	*#42422*	$3159
Acer	TI TravelMate	7060	MMX 166	2.0GB	32MB	10X	7.0lbs	12.1" SVGA TFT	*#44940*	$4449
AMS Tech	TravelPro	105CS	P150	1.3GB	16MB	10X	6.1lbs	12.1" SVGA DS	*#47337*	$1999
AMS Tech	TravelPro	188CT	MMX 166	2.1GB	16MB	12X	6.1lbs	12.1" SVGA DS	*#47338*	$2999
AMS Tech	TravelPro	2000CX	P150	2.1GB	16MB	10X	6.3lbs	13.3" XGA TFT	*#42931*	$3799
AMS Tech	TravelPro	2010CX	MMX 166	2.1GB	32MB	10X	6.3lbs	13.3" XGA TFT	*#42987*	$4699
AST	Ascentia	P 70	MMX 150	3.1GB	32MB	10X	7.1lbs	12.1" SVGA TFT	*#42413*	$3999
Compaq	Armada	1510DM	P120	1.0GB	16MB	10X	7.4lbs	11.3" SVGA DS	*#47304*	$1999
Compaq	Armada	1550DMT	P133	1.4GB	16MB	10X	7.7lbs	12.1" SVGA TFT	*#47306*	$3599
Compaq	Armada	7710MT	MMX 150	1.6GB	16MB	-	7.9lbs	12.1" SVGA TFT	*#47307*	$4999
Compaq	Armada	7750MT	MMX 166	2.1GB	32MB	-	8.2lbs	12.1" XGA TFT	*#47309*	$6299
Compaq	Presario	1070	P133	1.0GB	16MB	10X	7.3lbs	12.1" SVGA DS	*#39696*	$2499
Compaq	Presario	1075	MMX 150	1.4GB	16MB	12X	7.3lbs	12.1" SVGA DS	*#42979*	$2999
Compaq	Presario	1080	MMX 166	1.4GB	16MB	10X	7.3lbs	12.1" SVGA TFT	*#39697*	$4199
Fujitsu	Lifebook	420D	P120	1.0GB	8MB	10X	6.8lbs	11.3" SVGA DS	*#47314*	$1599
Fujitsu	Lifebook	535Tx	MMX 150	2.0GB	16MB	10X	7.3lbs	12.1" SVGA TFT	*#47317*	$3799
Fujitsu	Lifebook	655Tx	MMX 150	1.3GB	16MB	-	4.4lbs	12.1" SVGA TFT	*#47319*	$3999
Hewlett-Packard	OmniBook	5700CTX	MMX 166	2.0GB	16MB	-	7.7lbs	12.1" SVGA TFT	*#47352*	$4549
Hewlett-Packard	OmniBook	800CT	MMX 166	2.1GB	16MB	-	3.8lbs	10.1" SVGA TFT	*#47356*	$4649
Hewlett-Packard	OmniBook	5700CTX	MMX 166	2.0GB	16MB	Opt	7.7lbs	12.1" XGA TFT	*#47354*	$5199
Hitachi	Mx Series	Mx133T	MMX 133	1.35GB	16MB	8X	7.5lbs	12.1" SVGA TFT	*#39680*	$2999
Hitachi	Mx Series	Mx150T	MMX 150	1.35GB	16MB	8X	7.5lbs	12.1" SVGA TFT	*#42976*	$4399
Hitachi	Mx Series	Mx166T	MMX 166	2.0GB	16MB	8X	7.5lbs	12.1" SVGA DS	*#39699*	$4999
IBM	ThinkPad	365X	P120	810MB	8MB	Opt	6.1lbs	10.4" SVGA TFT	*#36732*	$1199
IBM	ThinkPad	365XD	P120	810MB	8MB	4X	6.4lbs	10.4" SVGA TFT	*#36733*	$1249
IBM	ThinkPad	365X	P133	1.08GB	8MB	Opt	5.9lbs	11.3" SVGA DS	*#36734*	$1399
IBM	ThinkPad	365XD	P133	1.35GB	8MB	4X	6.2lbs	11.3" SVGA TFT	*#36735*	$2699
IBM	ThinkPad	760EL	P133	2.1GB	16MB	Opt	7.0lbs	12.1" SVGA TFT	*#36739*	$4399
IBM	ThinkPad	760E	P150	2.1GB	16MB	Opt	6.4lbs	12.1" XGA TFT	*#36738*	$3899
IBM	ThinkPad	760ED	P133	2.1GB	16MB	6X	6.6lbs	12.1" XGA TFT	*#36737*	$4399
Kiwi	OpenNote	680C	P133	1.1GB	32MB	6X	6.0lbs	11.3" SVGA DS	*#42985*	$2099
Kiwi	OpenNote	680M	MMX 150	2.0GB	32MB	6X	6.0lbs	11.3" SVGA TFT	*#42986*	$3399
NEC	Versa	2530	P133	1.0GB	16MB	-	6.9lbs	12.1" SVGA TFT	*#42980*	$1999
NEC	Versa	6030X	P133	1.44GB	16MB	6X	7.0lbs	12.1" XGA TFT	*#34173*	$3999
NEC	Versa	6200MX	MMX166	2.1GB	32MB	10X	7.0lbs	13.3" XGA TFT	*#42954*	$6499
Toshiba	Satellite	220CDS	P133	1.34GB	16MB	10X	7.1lbs	11.3" SVGA DS	*#44989*	$1949
Toshiba	Tecra	510CDT	P133	2.1GB	16MB	-	8.25lbs	12.1" SVGA TFT	*#38819*	$3349
Toshiba	Portege	660CT	P150	1.2GB	16MB	-	5.2lbs	11.3" SVGA TFT	*#38820*	$4236
Toshiba	Tecra	730CDT	P150	2.1GB	16MB	6X	8.2lbs	12.1" XGA TFT	*#36718*	$4349

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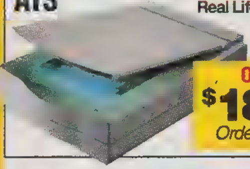

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KDS 1450 Reconditioned	13.2"	1280x1024	0.28	50-90	VESA/PnP	#39130	$169.98
NEC MultiSync C400	11.8"	640x478	0.28	60-118	MPR II/Nutek	#27642	$291.98
Performantz 1400	13.3"	1024x768	0.28	60-120	VESA DPMS	#35470	$189.98

15" Monitors	Viewable Area	Maximum Resolution	Dot Pitch/ Aperture Grille	Vertical Scan Rate	Features/ Safety	Order #	ONLY
Hyundai DeluxScan 15B	13.7"	1024x768	0.28	50-127	VESA DPMS	#37271	$249.98
KDS 1500 Reconditioned	13.8"	1280x1024	0.28	66-82	OSD/DPMS	#39137	$219.98
MAG InnoVision DJ-530	13.8"	1280x1024	0.28	50-120	MPR II/Jag Control OSD	#38737	$349.98
NEC MultiSync C500	13.8"	1280x1024	0.28	50-120	MPR II/Nutek	#86328	$389.98
NEC MultiSync M500	13.8"	1280x1024	0.25	55-120	Speakers, MPR II/Nutek	#86792	$379.98
Performantz 1500	13.63"	1280x1024	0.28	50-110	EPA/VESA	#85806	$289.98
Princeton E050	13.8"	1280x1024	0.28	40-120	FCC/MPR II	#35144	$285.98
Sony MultiScan 100sx	13.9"	1024x768	0.25	50-120	EPA/MPR II/Nutek	#82686	$369.98
Sony MultiScan 100sf	13.9"	1024x768	0.25	50-120	EPA/MPR II/Nutek	#82687	$419.98
ViewSonic 15GA PerfectSound	14"	1280x1024	0.27	50-160	Speakers, FCC/MPR II	#23484	$389.98

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NEC MultiSync M700	15.6"	1280x1024	0.25	60-120	Speakers, MPR II/Nutek	#86793	$769.98
NEC MultiSync P750	15.6"	1600x1200	0.25	55-160	MPR II/Nutek	#39138	$899.98
Performantz 1700 Color	15.75"	1280x1024	0.28	50-120	EPA/MPR II	#81091	$449.98
Princeton 74T	16.1"	1280x1024	0.25	50-120	FCC/ISO 9001	#38738	$639.98
Princeton 76T	16.1"	1600x1200	0.25	50-120	FCC/ISO 9001	#38739	$725.98
Sony MultiScan 200sf	15.9"	1280x1024	0.25	50-120	EPA/MPR II/Nutek	#06687	$799.98
Sony MultiScan 200sx	15.9"	1280x1024	0.25	50-150	EPA/MPR II/Nutek	#06689	$699.98
ViewSonic 17EA Multimedia	16"	1280x1024	0.28	50-120	Speakers, FCC/MPR II	#28000	$599.98
ViewSonic 17GS	16"	1280x1024	0.27	50-160	FCC/MPR II	#23486	$594.98
ViewSonic GT770 SonicTron	15.9"	1280x1024	0.25	50-120	FCC/MPR II	#87296	$670.98
ViewSonic 17GA PerfectSound	16"	1280x1024	0.27	50-160	Speakers, FCC/MPR II	#23483	$634.98
ViewSonic 17PS	16"	1600x1280	0.25	50-160	FCC/MPR II	#26526	$712.98
ViewSonic PT775 SonicTron	16"	1600x1280	0.25	50-160	FCC/MPR II	#82696	$829.98

20"+ Monitors	Viewable Area	Maximum Resolution	Dot Pitch/ Aperture Grille	Vertical Scan Rate	Features/ Safety	Order #	ONLY
NEC MultiSync E1100	19.8"	1600x1200	0.28	55-120	MPR II/Nutek	#80669	$1649.00
NEC MultiSync P1150	19.6"	1600x1200	0.25	55-160	MPR II/Nutek	#39139	$1989.00
Sony MultiScan 300sf	19.1"	1280x1024	0.25	48-150	EPA/MPR II/Nutek	#82688	$1599.00
Sony MultiScan 900w	22.5"	1920x1200	0.25	50-160	EPA/MPR II/Nutek	#80665	$4899.00
ViewSonic G800	18.4"	1600x1200	0.28	50-120	FCC/MPR II	#40971	$1095.00
ViewSonic GT800 SonicTron	19.1"	1600x1280	0.3	48-150	FCC/MPR II	#87295	$1199.00
ViewSonic P810	20"	1600x1280	0.25	50-160	FCC/MPR II	#84136	$1495.00
ViewSonic P815	20"	1800x1440	0.25	50-160	FCC/MPR II	#84170	$1659.00
ViewSonic 29GA SonicTron	27"	1600x1200	.75 stripe	45-160	Speakers, FCC/MPR II	#31216	$2099.00

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14397	Sony QD6525 1/4" Data Cartridge 525MB	$20.82
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34705	EZFlyer 230 Cartridge - Single	$29.99
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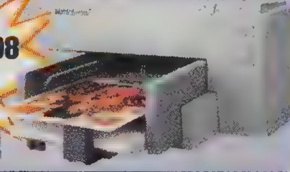

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Lexmark Color JetPrinter 1020	600x300	3/2	–	29K	8.5x14"	2	#31815	$149.98
Canon BJC-240	360x360	3/.27	7/300	62K	8.5x14"	1	#34188	$178.98
Canon BJC-4200	720x360	5/1	7/300	64K	8.5x14"	1	#34189	$278.98
Canon BJC-620	720x720	4/1.7	7/300	60K	8.5x14"	1	#34190	$329.98
Canon BJC-4550 Wide	720x360	5/1	7/300	64K	11x17"	1	#34191	$499.98
Canon BJC-70 Portable	720x360	4/.8	7/20	35K	8.5x14"	2	#21969	$299.98
EPSON Stylus Color 400	720x720	4/3	1	56K	8.5x44"	2	#80666	$229.98
EPSON Stylus Color 600	1400x720	6/4	5/4	56K	8.5x44"	2	#80667	$299.98
EPSON Stylus Color 800	1400x720	8/7	1	64K	8.5x44"	2	#80668	$449.00
EPSON Stylus Color 1500	720x720	3/1	5/4	256K	13.6x21.78"	2	#86318	$799.98
HP DeskJet 340 Portable	300x300	3/2-4	6/0	16K	8.5x14"	1	#27969	$279.98
HP DeskJet 672C	600x300	5/1.5	0/32	512K	8.5"x banner	1	#40979	$199.98
HP DeskJet 694C	600x600	5/1.7	8/35	512K	8.5"x banner	1	#40994	$299.98
HP DeskJet 820Cse	600x600	6.5/4	0/50	128K	8.5x14"	1	#86326	$349.98
HP DeskJet 870Cse	600x600	8/4	26/126	1MB	8.5x14"	1	#36156	$499.98
HP DeskJet 1600C	600x600	9/4	1/35	4/100MB	8.5x14"	1	#31068	$1349.00
HP OfficeJet 1150C	600x300	8/4	125	512K	8.5x14"	1	#40999	$999.98

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Brother HL-720 Windows	600x600	6	0/35	512K/2MB	8.5x14"	1	#31838	$349.98
Brother HL-730 DOS/Windows	600x600	6	0/35	512K/2MB	8.5x14"	1	#34168	$399.98
HP LaserJet 6Lse	600x600	6	0/26	1/9MB	8.5x14"	1	#41022	$399.98
HP LaserJet 6MP	600x600	8	35/75	2/50MB	8.5x14"	1	#82666	$949.98
HP LaserJet 6P	600x600	8	35/75	2/50MB	8.5x14"	1	#36186	$759.98
HP LaserJet 5se	600x600	12	0/110	4/66MB	8.5x14"	1	#41021	$1299.00
Okidata OP4W	600x600	4	–	128K	8.5x14"	1	#34167	$299.98
Okidata 16n	600x600	16	35/10	6/34MB	8.5x14"	1	#40988	$999.98
Lexmark Optra E	600x600	6	0/26	1/5MB	8.5x14"	1	#31817	$429.98
Lexmark Optra Rt+	1200x1200	16	39/45	4/64MB	8.5x14"	1	#36049	$1479.00
Lexmark Optra N	600x600	24	39/45	4/64MB	8.5x14"	1	#35278	$2679.00
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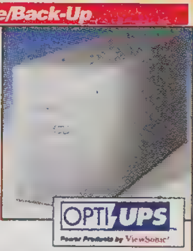

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05901	APC Back-UPS 450	$171.34
11651	APC Back-UPS 600	$237.18
88537	APC Back-UPS Pro 1000	$376.16
81900	APC Back-UPS Pro 420 PnP	$235.96
94395	APC Personal Surge Arrest 7 Outlet with Phone	$19.85
94394	APC Prof Surge Arrest 7 Outlet	$24.85
94393	APC Prof Surge Arrest 7 Outlet with Phone	$32.23
99364	Back-UPS 400	$140.32

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34526	OPTI-UPS 280 PnP Uninterruptible Pwr System	$96.76
34527	OPTI-UPS 420 PnP Uninterruptible Pwr System	$145.14
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42937	Cassiopeia A10 with 2MB RAM	$499.99
41732	Cassiopeia A11 with 4MB RAM	$599.99
43392	Cassiopeia UT-S11 Docking Station	$128.89

Compaq

42915	PC Companion C120	$499.99
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42941	Velo 1 Handheld PC	$739.99
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32775	Pilot 1000	$189.98
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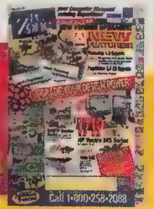

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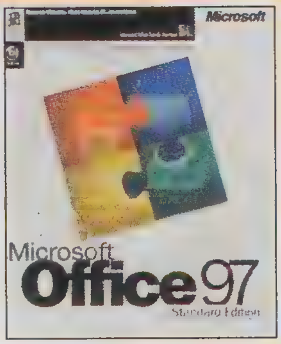

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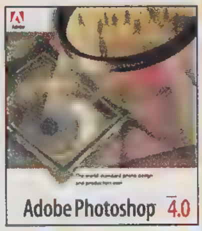

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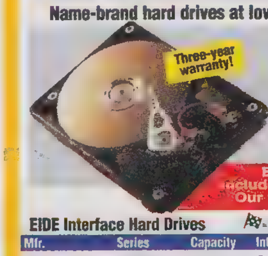

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Fujitsu	Winchester	1.700GB	EIDE-2/Fast ATA-2	🏁	10ms	128K	5400	16.6MB/sec	3yr	#35379	$189.98
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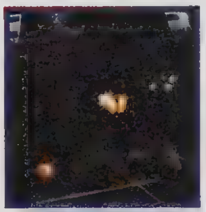

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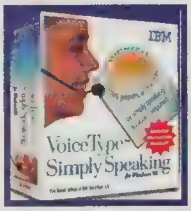

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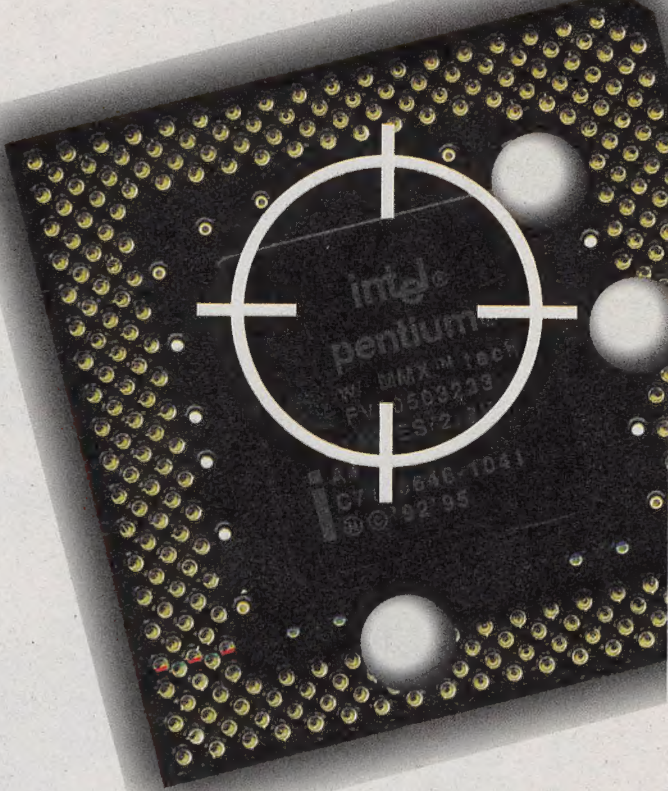
Product Information Number 278

COMING NEXT MONTH

THE PENTIUM KILLERS

__AMD's K6__ has emerged as a viable __alternative__ to __Intel's__ latest, and Cyrix's __M2__ is just hitting store shelves. Do these __Davids__ pose a __threat__ to the __Goliath__ of CPUs? Next month, we put these processors through their paces and __tell all__.



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A __visual__ guide to absolutely __everything__ you need to take your PC show on the __road__, from notebooks to PDAs to wireless modems to portable DSS dishes to GPS technology and __beyond.__

THE BOOTIES AWARD WINNERS

We announce the __winners__ in the August issue of boot *following the __star-studded__ ceremony in New York City at __PC Expo.__* boot *readers—the most __demanding__ in the world—waded through the __contenders__ and are making their voice heard: This stuff has stood the test and is deemed __best!__*

PLUS *A whole slew of the great stuff we spew each month that just adds to the __boot__ legend, such as: reviews of __SGI's O2__, __DEC's Alpha__, __Micron's__ "ultimate game machine," __LightWave 3D__, __Painter 5__, __Armored Fist 2__, and more software; the best __scanners__ are deemed bootWorthy; and the __digital camera__ shoot-out part deux!*

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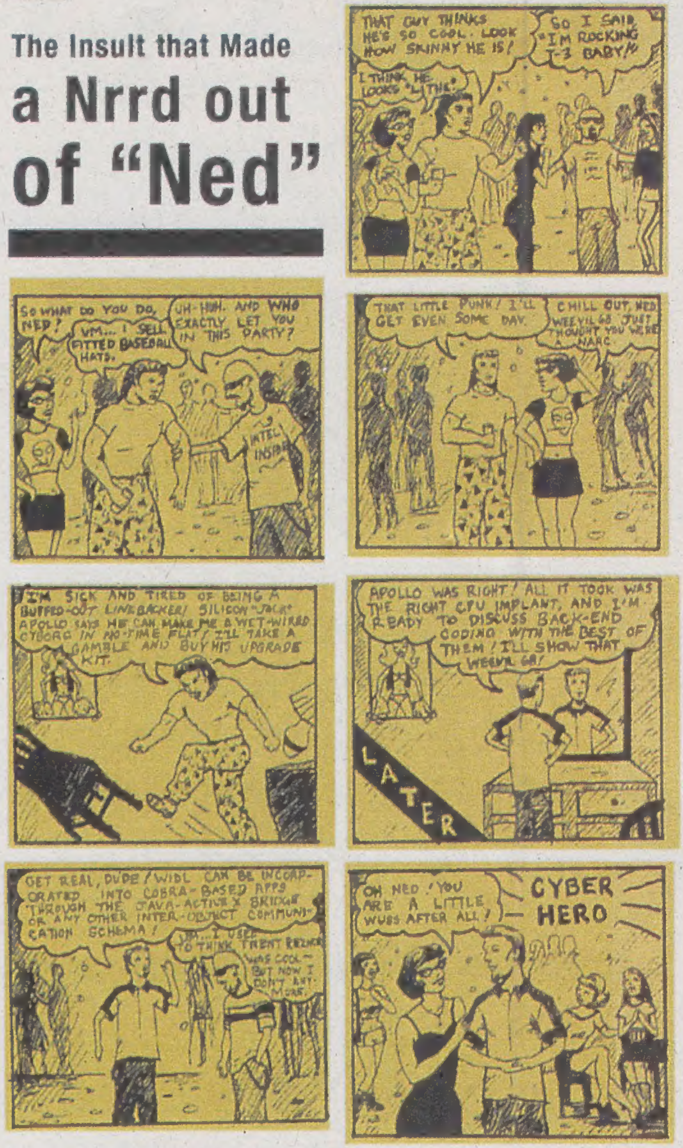
THAT GUY THINKS HE'S SO COOL. LOOK HOW SKINNY HE IS!
SO I SAID "I'M ROCKING T-3 BABY!"
I THINK HE LOOKS "LITHE."
SO WHAT DO YOU DO, NED?
UM... I SELL FITTED BASEBALL HATS.
UH-HUH. AND WHO EXACTLY LET YOU IN THIS PARTY?
INTEL INSIDE
THAT LITTLE PUNK! I'LL GET EVEN SOME DAY.
CHILL OUT, NED. WEEVIL 68 JUST THOUGHT YOU WERE A NARC.
I'M SICK AND TIRED OF BEING A BUFFED-OUT LINEBACKER! SILICON "JACK" APOLLO SAYS HE CAN MAKE ME A WET-WIRED CYBORG IN NO-TIME FLAT! I'LL TAKE A GAMBLE AND BUY HIS UPGRADE KIT.
APOLLO WAS RIGHT! ALL IT TOOK WAS THE RIGHT CPU IMPLANT, AND I'M READY TO DISCUSS BACK-END CODING WITH THE BEST OF THEM! I'LL SHOW THAT WEEVIL 68!
LATER
GET REAL, DUDE! WIDL CAN BE INCORPORATED INTO COBRA-BASED APPS THROUGH THE JAVA-ACTIVE X BRIDGE OR ANY OTHER INTER-OBJECT COMMUNICATION SCHEMA!
UH... I USED TO THINK TRENT REZNOR WAS COOL— BUT NOW I DON'T ANYMORE.
OH NED! YOU ARE A LITTLE WUSS AFTER ALL!
CYBER HERO

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How do you feel when you go to social gatherings? Do you feel "awkward" or "out of your element" when everyone in the "live-work industrial space" is decked out in the latest "urban street gear" but you're still wearing acid-washed blue jeans and a fraternity sweat shirt? Do you still drink Miller Genuine Draft or get "stoned" on marijuana instead of imbibing on some bizarre Belgian "lambic" or a designer hallucinogen that has yet to be made illegal? Do you stand silent in shame when everyone at the "scene" is complaining about "e-mail overload" or "corrupted file attachments," but all you can share is the forgettable story of how your mother sent you a birthday gift of raspberry petit fours via the U.S. Postal Service and the box arrived opened, damaged, and three days late? I know how you feel, for I too was once AN ANALOG WEENIE WHO LIVED IN SIMULTANEOUS FEAR AND AWE OF THE INCREDIBLE NEW DIGITAL ZEITGEIST THAT IS LEADING HUMANITY INTO THE 21ST CENTURY!!!

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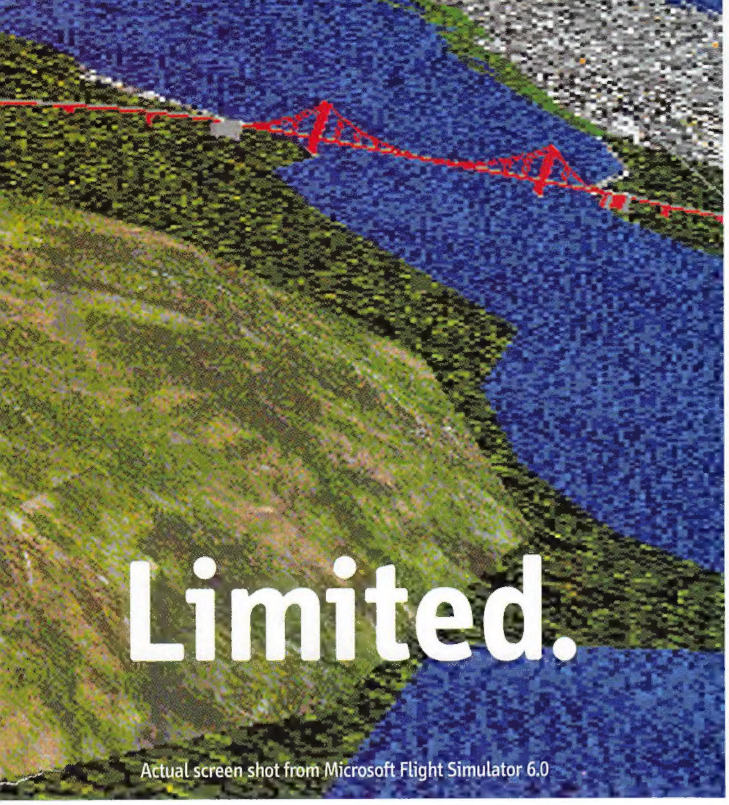
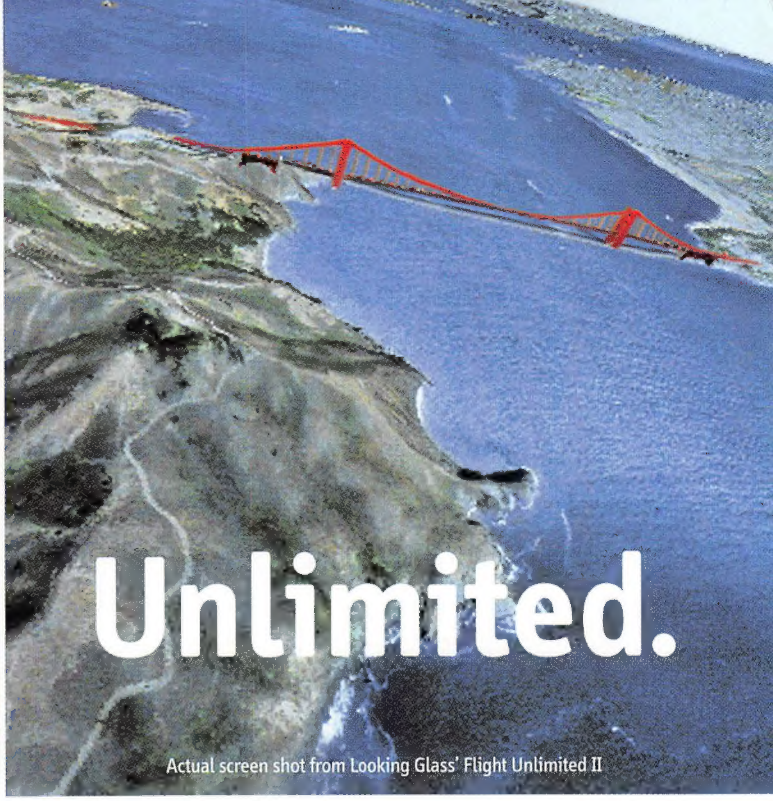
After months of humiliation, I discovered the secret that changed me from a "typical hetero beer jock" into the World's No.1 Fully Decked Cyber-Dude! What's my secret? SILICON IMPLANTS!!! That's right—no subscriptions to *Wired* magazine, no HTML courses at the local community college, and no trips to trendy clothing boutiques. All it took was a SINGLE 200MHz PENTIUM PRO PROCESSOR SOLDERED DIRECTLY TO MY HYPOTHALAMUS!!! Once the microprocessors began supercharging my hormone system, I changed my "analog tune" and quickly adopted a new way of life. Now I'm "one" with the NEW DIGITAL ZEITGEIST—from the inside out!!! I have an innate literacy of the Internet, my muscle mass is decreasing, and I dress like an Information Age Space Ninja!!!

PHOTOGRAPH BY GABRIELLE REVERE



Actual screen shot from Microsoft Flight Simulator 6.0



Actual screen shot from Looking Glass' Flight Unlimited II

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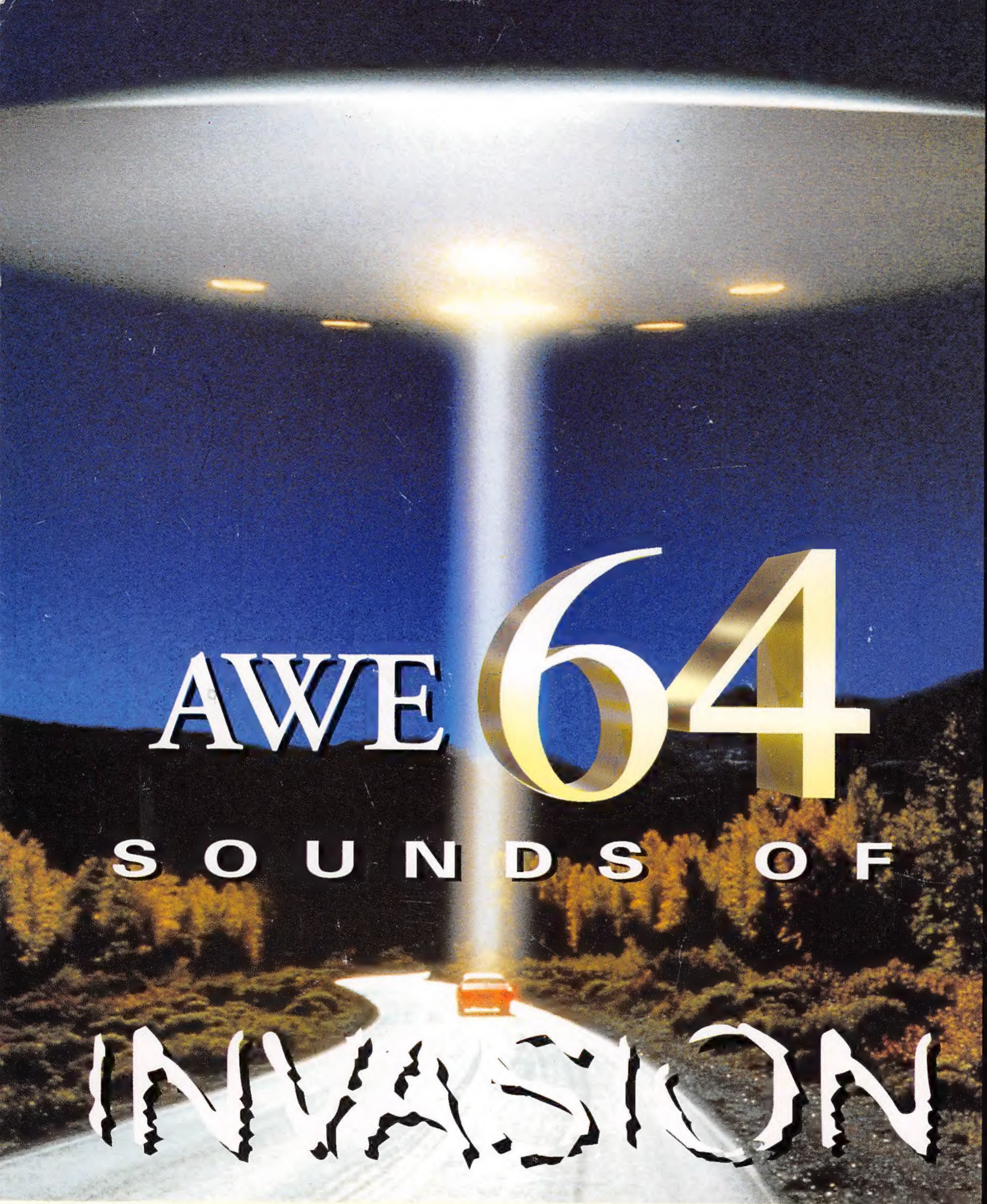

1. "We Come In Peace."
2. Blasting Ray Guns.
3. People Screaming.
4. "You Must Believe Me!"
5. Exploding Buildings.
6. Whirring Space Ships.
7. Brains Being Sucked.
8. Bones Crunching.
9. Aliens Phoning Home.
10. Metallic Scraping.
11. Cars Crashing.
12. Kidneys Bursting.
13. Insertion of Probes.
14. Heads Exploding.
15. "Run for Cover!"
16. "Warning."
17. Aliens Melting.
18. Pods Hatching.
19. Destroying the Monster.
20. Buildings Imploding.
21. Spaceships Docking.
22. Boiling Flesh.
23. "Mayday, Mayday!"
24. Exploding Spaceship.
26. "I saw a UFO!"
27. Planes Taking Off.
28. "We're at DefCon 1."
29. Aliens Communicating.
30. Children Crying.
31. Slurp.
32. Clink of Autopsy Instruments.
33. Laser Swords Crashing.
34. "Hyperspace!"
35. Flesh Being Torn Off Bones.
36. "They're Coming."
37. Wailing Sirens.
38. "You Must Die."
39. "Beam Me Up."
40. Zap!!!
41. Air Locks Closing.
42. "Oh, My God!"
43. Lasers Charging Up.
44. "We Need More Power!"
45. Ray Guns Blasting.
46. Calling the Mothership.
47. Horns Blaring.
48. "We Won!"
49. "Lock on Target!"
50. Crystals Charging.
51. Area 51 Guard: "No Admittance."
52. Zap-Zap!
53. Warning Alarms.
54. Air Locks Opening.
55. "Set to Stun!"
56. "Red Alert!"
57. Shields Up.
58. Warp Speed.
59. "Blast 'em!"
60. Eyeballs Squishing.
61. Spaceships Cloaking.
62. Radar Ping.
63. "Fire at Will!"
64. "Take Me to Your Leader."

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